THE IRON AGE

THURSDAY, JULY 10, 1902.

English Iron Trade Stagnation.

Under this title the daily press has widely published the following cable:

"Returns for the six months just ended show the production of all classes of manufactured iron in the North of England district to have been the smallest recorded in the history of the trade. The total was only 41,900 tons, compared with 46,206 tons for the same period of 1901, which was the worst previous half year. Compared with 1899, this year's output shows a diminution of 51 per cent."

The facts submitted do not justify the absurd inferences drawn from them. For many years a board of arbitration in the North of England iron trade determines the wages, on the basis of a sliding scale, by selecting certain mills and drawing selling prices on iron bars, rails, plates, &c. As we understand it, these figures determine the rate of puddling and deal with wrought iron only. The steady decline in the quantities reported simply reflect the falling away of puddling iron and do not in any way represent the activity of the trade of the North of England.

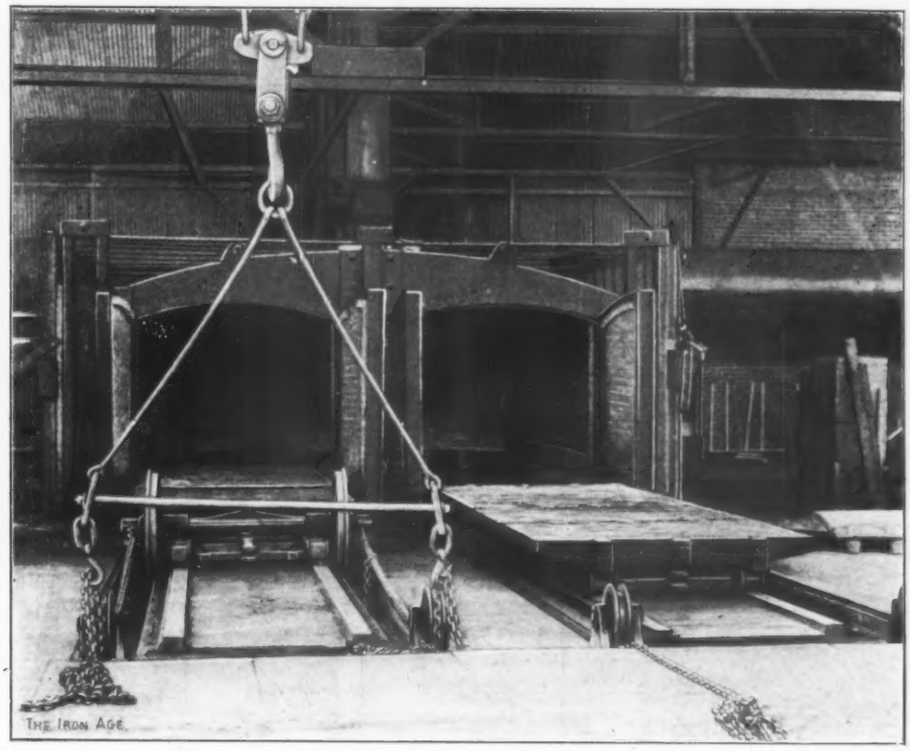
The Russian Metallurgical Syndicate.—It appears from reports which have reached this side of the Atlantic that the proposed Russian iron syndicate which has hung fire because the Hughes Company and the Donetz Company at Dronjkowka withheld their consent, is going ahead without them. It is to be called the Première Société Russe pour le Commerce des Produits Métallurgiques and is composed of two groups, the Société Métallurgique Dnieprovienne du Sud de la Russie and the Société Oural-Volga. The plan has been submitted to the Government for approval.

The Swindell Charging Machine for Annealing Furnaces.

BY JOS. A. 'NULL, PITTSBURGH, PA.

Some one, I believe, at one time or another, has written about the ox cart. It was a very useful means of transportation. By this means one could, by exercising sufficient patience and care, leave one place and at some later period arrive at another. The same object can be accomplished by using a railroad train.

At one time annealing furnaces in tin plate and sheet mills were charged by using rows of balls placed in grooves; also an arrangement known as a goose neck and other methods. The same object can be accomplished by using the Swindell annealing charger. It is the invention of J. D. Swindell, and is controlled and manufactured by the American Furnace & Machine Company of Pittsburgh.



THE SWINDELL CHARGING MACHINE FOR ANNEALING FURNACES.

On the right of the second engraving is shown the loaded charger ready to be put into the furnace. This is done by hooking the crane to the chains which run under the sheaves shown in the foreground and thence along the channels at the sides of the track and under two other sheaves located just outside the doors of the furnace and back to the pusher, Fig. 3, to which they are hooked, the hooks being attached to the ends of the axle, as shown in Fig. 1 on the left. The pusher is composed of the two larger wheels with a V-shaped frame, Fig. 4; the angle of the V couples to the platform on top of the carriages. By pulling up on the crane the platform and pusher go forward, the latter straddling the carriages, which also move forward, but just half as far; or, in other words, the platform and pusher move twice the distance that the carriages do in the same time. As soon as the platform is all in the

furnace that portion of the carriages still remaining outside is uncoupled and the doors closed.

The platform is so arranged as to rest no weight whatever on the frame of the carriages, but runs on the rollers themselves, thus making the points of bearing practically frictionless and allowing of a maximum weight being moved by a minimum power. The frame serves only to keep the rollers evenly spaced. In the old method of using balls placed in grooves it is impossible to keep the balls evenly spaced. In some places they get apart, leaving nothing to support the load, and in others rub against each other, causing considerable friction. Fig. 2, on the left, shows the carriages ready to be uncoupled and the doors closed. Fig. 1, on the left, shows the pusher coupled direct, in the act of pulling the empty charger out of the furnace. (In this picture the charger is not loaded, as would be the case in operation when taking out of the furnace.) On the right of Fig. 1 the charger is ready to be loaded. One pusher can be used to advantage for six or seven furnaces. Other methods of power can also be applied.

One man, besides the one on the traveling crane, can charge a whole furnace in three or four minutes. This reduces labor, saves fuel, increases production, and protects the furnace from the rapid contraction and expansion caused by the change of heat and cold where the doors have to be left open too long. The track is so designed that it will not twist or warp, and, no weight being put on the frame of the carriages, there is nothing to get out of order. Over four years' use of the charger proves this, and also proves that it will not burn.

For a continuous furnace it can be used to still greater advantage. In this kind of furnace, by charging a new lot of boxes it is possible to take out the ones already annealed at the same time.

These frictionless carriages can be satisfactorily applied to many other uses, and can also be formed into an endless chain (retaining the same principle) to run on a specially designed track or into a circular plan for turntables.

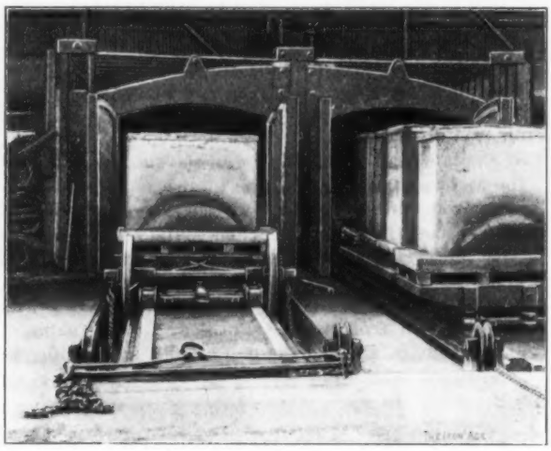


Fig. 2.—Loaded Charger Ready to Enter Furnace.

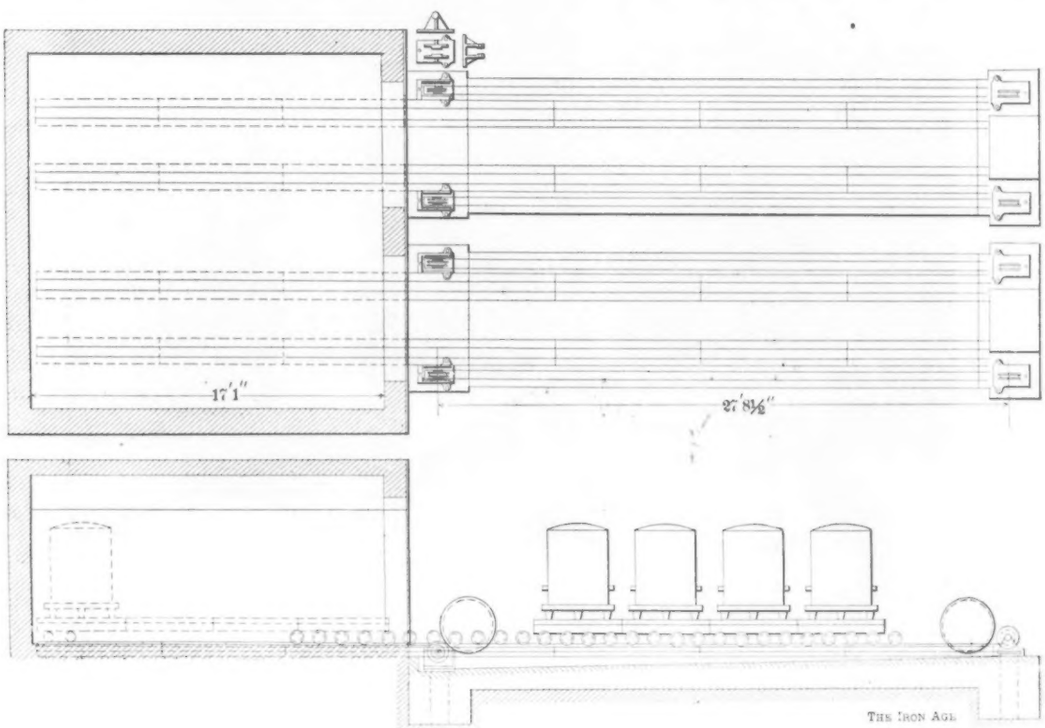


Fig. 3.—Sectional Plan and Elevation.

THE SWINDELL CHARGING MACHINE FOR ANNEALING FURNACES.

The Year Book of the Michigan College of Mines has just been issued. The college was established by the State in 1885 and has been an important factor in Western technical education since that time. Though but now closing its sixteenth year this school has graduates in successful work in almost every district of North America, in South and Central America and on the other side of the world. Its list of graduates and their employment forms a very suggestive and interesting chapter. There has been a concentration of effort on the training of mining engineers, quite naturally so since the school is located in a great mining region, in what might be called a mining atmosphere. Its methods of using this environment are such as to get from it the utmost possible assistance, both practically and theoretically. Within a radius of 11 miles from the college buildings are 20 great copper mines; surrounding it at a greater distance, but still near, is mined three-quarters of the iron ore of the United States. Both copper and iron mines are leaders in their classes. While the Michigan College of Mines does not undertake the duties of an employment agency for its graduates, it assists them in so far as its power and their capacities lie. The department heads of the college are as follows: F. W. McNair, president, Physics and Mechanics; G. A. Koenig, Chemistry and Metallurgy; F. W. Sperr, Civil and Min-

ing Engineering; O. P. Hood, Mechanical and Electrical Engineering; A. E. Seaman, Mineralogy and Geology; Jas. Fisher, Jr., Mathematics and Physics; Mrs. Francis H. Scott, librarian and secretary.

The Duty on Charcoal Bar Iron.

The Board of General Appraisers has recently rendered the following decision in the case of Wheelock, Lovejoy & Co. against the Collector of Customs at New York:

The merchandise in question consists of charcoal bar iron. It was assessed with duty at the rate of six-tenths of 1 cent per pound under the provisions of paragraph 123 of the act of July 24, 1897, and is claimed by the importers to be properly dutiable at the rate of $12 per ton, under the provisions of the last proviso to paragraph 124 of said act.

The precise question presented by these protests was passed upon by this board in G. A. 4834 adversely to the importers. The board held in that case that the operation of the proviso to paragraph 124 was limited to the paragraph of which it formed a part, and that as the language of the paragraph limited it to only bars or shapes of iron not specially provided for elsewhere in the act, bar iron was not assessable thereunder for the reason that such commodity was specially provided for by name in paragraph 123, under which it has been assessed. On appeal to the Circuit Court of the United States for the southern district of New York, in the case of Milne *vs.* United States (decided April 21, 1902), the said decision of this board was reversed. Judge Coxe, in his opinion in that case (not yet published), said:

"There is no evidence in the record upon which the court can base a finding that there is a distinction in meaning between the bar iron of paragraph 123 and the iron bars of the second proviso. If such distinction existed in trade and commerce when the tariff act was passed, it should have been shown by competent testimony. The ordinary meaning of words must govern in the absence of proof of commercial meaning. Starting then with the postulate that bar iron and iron bars mean the same thing in tariff nomenclature, there seems no escape from the proposition that the importers' contention is correct. They imported from Sweden iron bars made with charcoal as fuel, and the proviso says that 'all iron bars' so made shall pay $12 per ton. It is difficult to perceive why they are not within the express terms of the proviso."

The Treasury Department has acquiesced therein.

The court did not pass upon the question whether the terms of the proviso were limited in their operation to the class of articles enumerated in the paragraph of which it formed a part, but merely sustained the claim of the importers that bar iron was one of the forms of iron specifically provided for in the proviso, bar iron and iron bars being interchangeable terms.

Following that ruling, we hold that the merchandise covered by the various invoices and described therein, or returned by the local appraiser, as charcoal bar iron is properly dutiable at the rate of $12 per ton under the last proviso to paragraph 124. The protests, therefore, which make such claims as to such specific merchandise are sustained and the decisions of the Collector reversed. The protests are, however, overruled as to all other merchandise covered by said invoices.

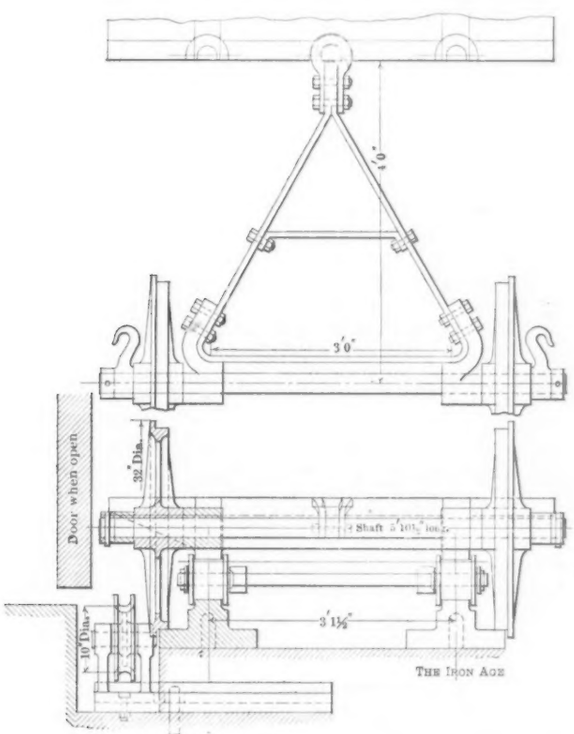


Fig. 4.—Details of Pusher.

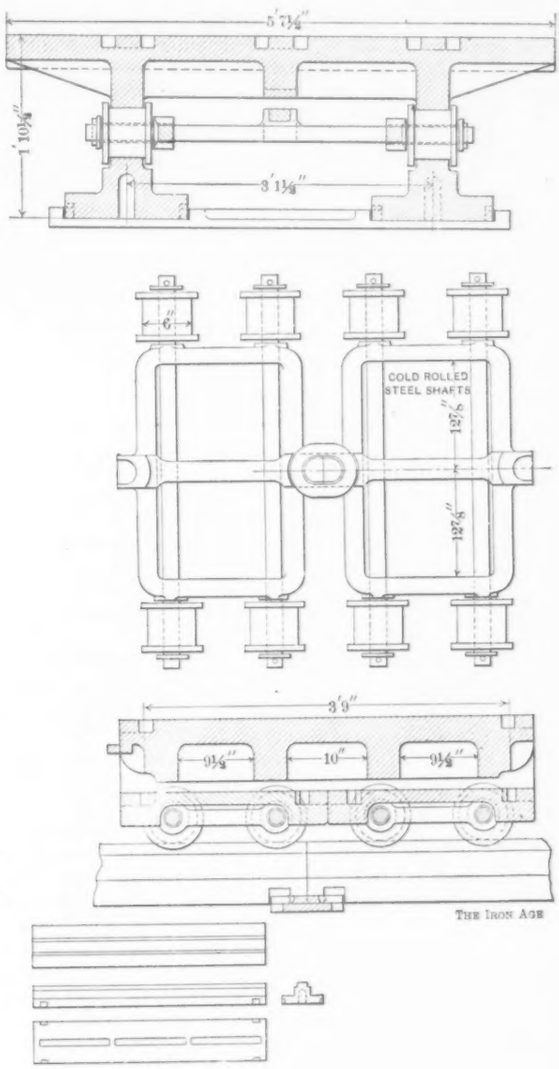


Fig. 5.—Details of Carriages.

THE SWINDELL CHARGING MACHINE FOR ANNEALING FURNACES.

It is claimed that natural gas has been struck by the Cramp Steel Company within a mile of the plant at Collingwood, Canada.

The Status of Alcohol as a Power Source.

BY MARIUS C. KRARUP.

From the mass of conflicting testimony which arrives from European sources of information with regard to the employment of alcohol and alcohol mixtures in automobiles, it is not easy to draw definite conclusions as to the future of this fuel or the probable effect of its introduction in those spheres of usefulness which have heretofore been occupied exclusively by petroleum, kerosene and gasolene. Much of the uncertainty which reigns is due to the fact that the purposes of the recent extensive trials given to the new fuel in France have other than scientific aims, and that even in Germany—a country less sharply suspected of sensational methods—the prominence accorded the use of alcohol for industrial purposes by the Government, is known to be more or less due to the political motive of conciliating the Agrarian party. After all doubts have been duly entertained, the fact remains, however, that neither the French nor the German Government can afford to expose itself to ridicule, and that alcohol, therefore, must possess at least sufficient merit to save its advocates from the accusation of claptrap methods or a foolish enthusiasm for novelty for novelty's sake. The figures relating to the trials conducted on May 15-17 under the direction of Jean Dupuy, the French Minister of Agriculture, supply a material, moreover, which leaves no room for the supposition that the use of alcohol for power purposes might be considered a mere fad, for the results obtained with some of the automobiles participating in the trials come near enough to those obtained with essence (gasolene or benzine of petroleum), on the points of speed of the vehicles and economy of fuel consumption per ton mile, to suggest the probability of a very lively competition as soon as the work done for adapting motors to the use of alcohol shall have reached the degree of refinement that has been devoted to gasolene motors. As to the substantial accuracy of these figures no reasonable doubt may be entertained.

Such facts, as that the city of Berlin continues to use pure alcohol for the illumination of public buildings and places, also speak favorably of the possibilities of alcohol in other industrial and commercial directions.

It is not necessary to go much deeper into the facts to explain why American manufacturers are beginning to feel interested in the alcohol movement and even anxious to ascertain wherein its principle of vitality consists. Whether it is local for Germany and France or draws more deeply and in time may affect our industrial conditions, is one of the leading questions, and a good deal of zest enters into this question upon the reflection that only the fiat of our internal revenue laws stands between our present prohibitive price of alcohol and one so very much lower as to challenge gasolene and even kerosene, seriously, on the economical issue alone. It is known that the consumption of gasolene has increased rapidly during late years, partly by reason of the spread of automobilism, and that the price has increased therewith. While the crude petroleum of which it is one of the products of refining is not strictly limited in quantity, it is, on the other hand, not subject to arbitrary increase, and if the next ten years should see an increase in automobilism and the employment of small motors corresponding to that which has already taken place, the price of gasolene should certainly go much higher still, unless a new fuel may be substituted in whole or in part.

The Attitude of Oil Interests.

It has been stated that even at present the distillation of gasolene of certain desirable grades interferes to some extent with other petroleum products, for which there is an established and satisfactory demand, and that this accounts for the difficulty experienced by automobilists in obtaining anything better than 73 degree Beaumé naphtha, or "stove gasolene," while European consumers get the 76 degree fluid derived from the same sources of supply but refined in Europe. In this connection the further statement has been made by one who is identified with the Standard Oil Company, that this corporation would extend a glad welcome to alcohol as a partial substitute for gasolene, because it sees a demand ahead which it would prove difficult to satisfy, and the policy of the organization has been, and is, in the direction of lower rather than higher prices.

The writer has so far been unable to receive confirmation of this view from others in authority, but would be inclined to believe in its correctness, judging from semi-official advice which emanated from the Standard Oil Company some time ago with relation to the grade of gasolene for which the carburetters in automobiles should preferably be constructed, and incidentally indicating the fuel feed system which has also been found best adapted for motors operated with alcohol or alcohol mixtures. It will readily be seen that the position taken by the principal producer of gasolene becomes a matter of some consequence for the progress of the alcohol movement in this country, where one of the main reasons for indifference to it so far has been based upon the abundant home supply of crude petroleum, and the comparatively low prices of the products distilled from it.

After having decided that the two weightiest obstacles to the employment of alcohol for power generation in this country—the internal revenue laws and the home supply of kerosene and gasolene—may after all not prove irremovable, one is led to inquire further into the results obtained in Germany and France. If there is high economical efficiency to be derived from alcohol, why is it not used in stationary motors as well as in automobile motors? This is one of the questions which naturally arises to the factory economist, especially when he contemplates the possibility that the use of the new fuel in this country of quick changes and rapid production, might spread to other fields than automobilism with more rapidity than elsewhere. He remembers perhaps the time when he installed a stationary kerosene motor in his factory for reasons of safety and economy, and the subsequent occasion when he changed back to gasolene for equally thrifty reasons of convenience and reliability. The prospect of having a third factor to consider is disquieting. Why, also, it is asked, if alcohol is so efficient, do the automobilists gain laurels in "alcohol races" and "alcohol consumption tests," and then, when the choice of fuel is free, return to gasolene for daily use and for all contests where reputation is at stake? This question has been asked also in France, where information on the whole subject is nearer at hand, and there has been no lack of derisory comment upon the lavish decoration of the offices of automobile manufacturers with certificates and medals obtained in alcohol trials, while the recommendations of the same manufacturers to their customers, through catalogues and otherwise, strongly point out the advisability of securing pure gasolene.

Alcohol and the Excise Authorities.

For these apparent discrepancies there are, however, quite satisfactory explanations. They may be traced to the fact that the alcohol movement has grown strong under conditions which changed from day to day. Many statements which reverberate uncontradicted in American class journals to-day are translations of reports which appeared in foreign journals at a time when experience with alcohol was still rudimentary. An interesting letter from a man well versed in the adulterations of alcohol is before the writer (in a French technical paper), in which the impositions were pointed out to which an automobilist touring in France might be subjected if he should attempt—one half year ago—to buy alcohol for his automobile in the provinces, and the direful results to his motor and his enthusiasm for the agricultural hydrocarbon product, as well. In *L'Illustration*, L. Baudry de Saunier comments entertainingly upon the obstacles laid in the path of experimenters by the excise authorities. This was in 1900. Not satisfied with adding methylene to all alcohol that was to be used for industrial purposes with the object of rendering it unfit for drinking and incidentally adding 2 cents to the cost per liter, these authorities, jealous of their revenues, thought it necessary to take another precaution for obviating frauds by making the industrial alcohol easily recognizable by its color. To this end they added another drug of bright green hue—malachite. The alcohol thus doubly denaturized, as the phrase goes, was tried in lamps and

in automobiles. The wicks took the color of sea grass and became clogged. A green deposit settled in the carburetters and on the valve seats. Finally the Régie (the internal revenue department) was prevailed upon to desist from this extra admixture, and henceforth the denaturized alcohol was allowed to remain limpid and colorless, though still with the nauseating, but otherwise neutral, methylene added to its composition. In the meantime, however, the experiments with alcohol were not satisfactory in France, and Germany made considerable headway.

Lately France has apparently forged to the front again, but though technical information from Germany is rather scant on the subject and withheld from published reports, there seems to be ground for the belief that German experimenters are tackling the problem more radically than the French, aiming for results with pure alcohol where the French are satisfied with using a 50 per cent. mixture of alcohol and benzine. For many reasons the French method of progress is perhaps the more practical of the two, and especially because it permits the use of gasolene motors for the experiments without any onerous alterations in construction.

German Experiments.

The German competitor has virtually undertaken to design a special motor, from theoretical considerations, which shall prove as suitable for pure alcohol as the modern gasolene motor is for pure gasolene. And in doing so, he seems to cut himself off from the advantage of learning the peculiarities of the new fuel without paying dearly for each error and for each advance step. The French experimenter takes the ground that he knows the gasolene motor so well that he should be able to reason with just as much certainty from half charges of alcohol as from whole ones, and while making his deductions he is able to make a fine showing of progress to the world at large, and the agriculturists of France in particular, thereby falling in line with the purposes of his Government and encouraging the whole people to believe that automobilism represents a "grand national industry" destined to bring prosperity to the farmer, economy and convenience to other industries and commerce, as well as pleasure to the rich and glory to the nation. If anybody is deceived it will be his own fault. After all there is a flavor of true democracy in these methods, while on the other hand the assumption that the use of pure alcohol can be made economical and satisfactory seems a trifle doctrinaire. This assumption represents, however, the standpoint taken by the Prussian Minister of Agriculture and Minister of War, who jointly have arranged a prize competition for inventors, the object being to encourage the production of a traction engine and vehicle propelled by pure alcohol (gasolene allowed for starting), and adapted for military use. It is taken for granted that the vehicle which complies with the extremely severe requirements for war transports will also easily satisfy the less exacting requirements for hauling of heavy merchandise, especially the products of the many rural estates and crown establishments where agriculture and manufacture (distilleries, beet sugar, &c.) go hand in hand. In this prize competition the specifications are very minute in regard to the vehicle construction proper, but these refer to automobile problems in general. The engine construction is left wide open without any other limitations than the fuel—and the results.

Variations in the Results.

Leaving it to be decided by the test of time whether conclusive results will first be reached by the gently temporizing, shrewd methods of France, or by the masterful determination of the Germans, the American inquirer asks again, "Why is it that the tables showing the fuel consumption of the various automobiles in the recent French tests show such an extreme variation in economy and efficiency? If the alcohol problem has been solved there should be more regularity." Perhaps this question is not asked very deliberately or seriously, but it represents the attitude of an inquirer who has just been awakened to the possible importance of the subject and has not yet given it much thought. To those who have followed the movement, it must be evident that the best results attained by any one investigator represent the results to date, and that other inferior results do not count for determining the possibilities of the fuel. The difference between knowing what results have been reached, and knowing by what means they have been reached, must be apparent. We hear that the Chenard-Walcker automobile has given the highest economical efficiency in a series of trials, but until we know the exact construction of the Chenard-Walcker motor, and even of the power transmission gear and vehicle design, we are still in the dark in regard to the conditions under which alcohol may be most successfully utilized. And when we then hear that the Chenard-Walcker machine also gives the most economical results when operated with gasolene, the basis for exact reasoning gives way. Add to this that results vary almost as widely in those tests in which gasolene exclusively is employed as in the special alcohol tests. If one should undertake to form theories by laborious study of the construction of each vehicle and comparison of results from the various tests which have been held, the uncertainty becomes at once bewildering, partly on account of the changes in the alcohol mixture, which has been subject to constant experimentation, and partly because it is practically impossible to verify one's knowledge of construction details. The manufacturers keep to themselves most information in regard to specific changes of motors, gears, carburetters and ignition, factors which all relate to the deeper insight in the problem. The published reports of the tests are silent on such subjects as corrosion of valve seats, and piston rings; yet it is known that corrosion forms one of the vital objections to the use of pure alcohol (which always contains more or less of water), but one which does not manifest itself strongly except after prolonged trials, and can be obviated on exceptional occasions by special precautions.

Altogether these factors render it useless at this distance to go into the details of the earlier trials. Only the latest tests show the status of the movement, and these only in the general features. This is all the more the case since there has never been any attempt at uniformity in the composition of the alcohol mixture, until Mr. Lepretre, a refiner, induced practically all competitors in the ministerial tests in May to use his Electrine, having previously convinced them of the excellent results to be obtained by it. It is worth noting that this preparation is not formed from alcohol and gasolene, or "essence of petroleum," but from alcohol and benzine distilled from coal, the composition being very nearly 50 per cent. of each. By substituting benzine of coal for benzine of petroleum, the French refiner not only gained the important point that he could proclaim his mixture a thoroughly national product of the soil of France, but he also succeeded in making the mixture richer in carbon. While gasolene contains about 8260 caloric units per liter, alcohol of 90 degree purity contains only 4850. In the new mixture the calories reach the figure of 7850 per liter, according to what seems reliable report, and this high percentage of carbon which this represents is not usually attained in alcohol mixtures. Another source of information gives the composition as follows: Carbon, 88.99; hydrogen, 9.48; oxygen, 14.77; water, 6.55, and the heat units 7.453 per kg.

As an example, showing the results obtained with this mixture, a parallel between figures obtained from the recent 100-mile contest held by the Automobile Club of America, and corresponding figures from the May contests in France might be instructive if the conditions of the two contests had been similar. But in the New York-Southport test the speed of the vehicles was reduced far below their capacity, and fuel economy under those circumstances was an illusion. The course, also, was a hilly one. On the other hand, the French test was held during a rain and wind storm and over muddy roads. If the results were to be accepted on equal terms, the showing would be greatly in favor of 50 per cent. alcohol mixture over pure gasolene, volume for volume. Under the actual conditions they show that there is plenty of room for the belief that ultimately alcohol may win out as the better fuel, and any more definite conclusion it seems impossible to reach at the present time except by violating the rules of safe reasoning.

Only one point in construction seems to have been fully demonstrated in all of the French tests. Throughout the large range of variations in full consumption, the alcohol always gave best results, other things being equal, in the large vehicles transporting heavy loads. But whether this effect shall be ascribed to one or another of the peculiarities of the fluid is still a subject for debate. The lesser violence of the alcohol explosion is a feature agreed upon by all. It may be due to the presence of water and the consequent generation of steam at each explosion, accompanied by reduced rapidity of flame propagation, and seems to indicate a reduction of piston speed as advisable in alcohol motors. In accordance herewith the length of the piston stroke has been increased in many motors designed to be operated optionally with gasolene or alcohol mixture. But it is not the object in this article to enter into mechanical details. To do so profitably would involve the necessity for much more reliable and first hand information than is at the disposal of the writer.

Alcohol for Steam Vehicles.

In a general way there only remains to be noted the substitution of Electrine for kerosene as a fuel for steam vehicles. For reasons of safety Mr. Serpollet, the well-known French constructor of flash boiler steam vehicles (or what was originally flash boiler vehicles, but have since been modified considerably), has used kerosene for fuel in his Gardner-Serpollets. For the Government trials in May he used the alcohol mixture in four of this class of automobiles. The result was highly satisfactory and has been commented upon as a remarkable demonstration in favor of alcohol. It need hardly be said, however, that the demonstration, while useful and timely, cannot possibly have any bearing upon the question of the relative merits of gasolene and alcohol, as it was perfectly well known beforehand that the Serpollet vehicles could be operated more conveniently with gasolene than with kerosene, but that the heavier oil was chosen for reasons of safety and economy despite its attending evils of odor and smoke. The successful use of alcohol in this instance may point a moral for manufacturers of steam vehicles, the alcohol mixture being somewhat less inflammable than pure gasolene, but it bears no relation to its employment in internal combustion motors.

Disorganized Labor.

BY E. P. WATSON.

A portion of the workingmen of this country are engaged in enterprises of their own conception which are opposed to the welfare of the community generally, and have associated themselves under various sonorous titles in attempts to curtail the privileges of other workingmen, one of them being the right to sell their labor in open market to whomsoever will buy it. The disaffected moiety have already inflicted serious loss upon the community in their vicinity and the end in the mining regions is not in sight. Those who claim to be in a position to know assert that the sum of $40,000,000 has already been expended upon the strike of the coal miners without any solution of the dispute. It is plain that it should not be possible for any body of men to cause such commercial disturbances when a preventive for them exists. This is to compel all associations whose ostensible business is to benefit workingmen to take out charters and become incorporated bodies, which can sue and be sued, in the same way that all other companies, banks, insurance, manufacturers, &c., are compelled to, in order that the public shall be protected against loss in dealing with them. If it is necessary that workingmen should have business organizations to forward their interests or guard them against unknown and unspecified enemies, by all means let them be set in operation forthwith under the same auspices that obtain in regular occupations. No one has ever entered a protest or in other ways objected to labor unions with legitimate ends in view, and capitalists have been long suffering in the hope that their employees would see that there cannot be in the nature of things a division of interests, but this expectation has not been realized, and is not likely to be so long as unwise counsels prevail. The choice of head men has not been fortunate in the associations; much more than an ability to make speeches is requisite in leaders of men, for talk alone accomplishes nothing; but out of all the persons prominent in labor associations in the past 25 years not one set his followers in the road that leads to permanent improvement of the conditions which tend to ameliorate whatever hardships appertain to a workingman's life. Not a man of all the counselors has inculcated common sense views of the situation, or told his disciples that there were two sides to every argument, or placed the issues fairly before them. The men have always been told that their side was the only one, and were without defense or preparation for any other aspect of the situation when confronted with it. They have been assured of the support and sympathy of the public when they were acting directly against its interests and causing it to suffer loss and inconvenience in many ways, and there has always been sedulously instilled the idea that labor was in itself omnipotent and could accomplish all its ends and aims by dint of stubborn insistence upon them. Workmen have been told that there is one law for them and another for those who differ from them, but no law at all for those who are entitled to work when and where they please, and they are law makers and law breakers on the whim of the moment. With one face they profess to desire law and order only, with another they would destroy those who "take their places," as if they had titles to occupations they had willfully abandoned. The inconsistencies of the plans, so called, of their leaders do not seem to occur to them.

Not so many years ago superintendents made lists of "certain lewd fellows of the baser sort," who went about obtaining situations with the sole purpose of stirring up strife and disaffection where they were hired. This was called "black listing," and a great hue and cry was made over it by the men. Now exactly the same course is pursued by them in the "unfair list"—that is employers who insist upon the management of their own properties without dictation from outsiders, whoever they may be. Arbitration, also, was to be a general panacea for overt acts and encroachments upon either side, but it was speedily ascertained when put to the test that no verdict was valid which did not cede all to the workmen. The failure of all these external applications to cure a chronic difficulty could have been foretold, but they are still evoked in some cases where it is known that they cannot or will not be accepted. One of the causes of the present unhappy position of the coal miners was their demand for an eight-hour day, with, of course, pay for ten hours. They profess to see nothing unreasonable in this, for all the operators would have to do would be to concede it; but when the operators in their turn demand that the men shall mine 3000 pounds of coal to the ton (to make up for uncommercial refuse), they, the miners, call on heaven and the public generally to bear witness to the wrong inflicted on them!

The inevitable sequence to following schemes which lead nowhere, to commencing a campaign without plan, means of subsistence, arms or ammunition, is disorganization and defeat, and this is the present aspect of affairs in the coal regions. The strikers were promised that their families would be taken care of if the men would go out. There were 145,000 miners involved, and if any one of them had sat down and figured the amount required to pay only $3 per week to each man he would have found it to be very nearly $500,000. Not all of the miners went out, however, so the sum named would be somewhat less, but in any event it is large. If the strikers had inquired of the treasurer of their society how much of this money was immediately available they might not have been so precipitate in voting themselves out of their jobs.

It is fortunate for the people at large that but a comparatively few workmen have listened to the false doctrines and sophistries of their disorganizers, for, if the number was large, we should all have to sit down and reconstruct ourselves, or others, until we were in accord

again. The blind have led the blind and both have fallen into the ditch. The plight of the uneasy element among workmen is certainly pitiable upon many counts. They are endeavoring to serve two masters, their unions and their employers, and by far the greatest portion of their allegiance is given to the former. "Their honor rooted in dishonor stands, and faith, unfaithful, keeps them falsely true." Between the devil and the deep sea they know not which way to choose, and not until they cease following after strange gods will they ever win back to the peace and security of the days when there were no leaders to mislead them. There is no country upon the face of the earth where workingmen have the privileges which are accorded to them here; no place where anything like the wages are paid, and a man is what he makes himself. There are none trying to wrest these privileges from them, as they are falsely told, and no other country where equal justice is meted out to all, regardless of wealth, social station or any other condition. It is regrettable that there are a small portion of the people who do not appreciate the benefits secured to them by the Constitution, but perhaps continual and costly defeats in trying to set up their own ideas will turn them from the error of their ways.

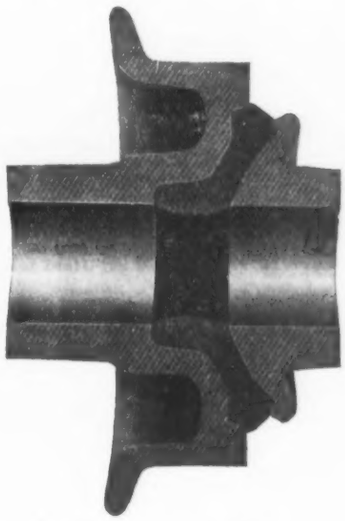


Fig. 1.—Section of Roller.

The Link-Belt Absorbent Roller for Conveyors.

Criticism of the wheeled conveyor centers upon the rapid wearing of its supporting rollers and their journals. Carriers and conveyors of this class are in wide and extending use, but their introduction has been hampered by the knowledge of the serious and expensive delays resulting from the short life of the carrying rollers. The absorbent roller, manufactured by the Link-Belt Engineering Company of Philadelphia, is provided with fibrous packing, which secures the full advantage of capillary attraction in conveying oil to the journal of the roller, and combines with this an automatic and convenient means of renewing the supply of oil. A sectional view of the roller is presented in Fig. 1, while in Fig. 2 is shown a method of supplying oil to the absorbent packing when the carrier is vertical or inclined. Under this condition the oil is fed to the roller from an over-

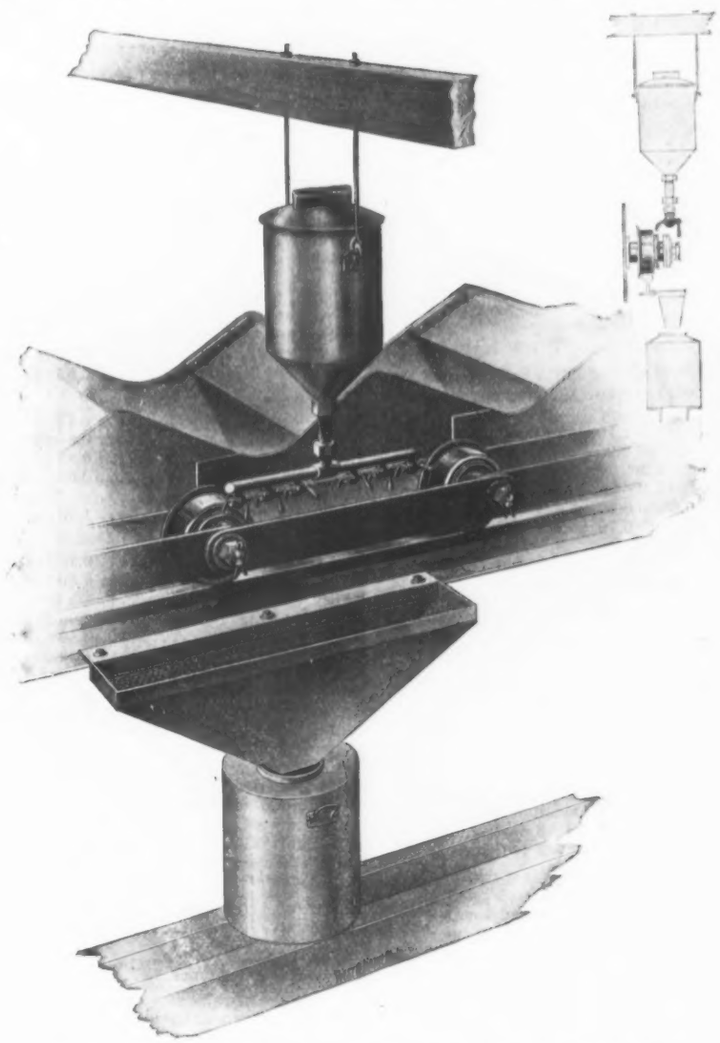


Fig. 2.—Method of Supplying Oil when Carrier is Inclined or Vertical.

THE LINK-BELT ABSORBENT ROLLER FOR CONVEYORS.

hanging reservoir, the feed being governed by small cocks. The principle embodied in the device is not limited in its application to conveyors and conveying machines, but is of value in many other instances.

The Selection of Steel for Various Articles.—I.

We print below a list of a series of articles accompanied by the carbon contents which have been found by experience to be the most suitable for the purpose to which the steel has been put. Of course, all steel makers do not use to a point the carbons given.

Articles Made from Crucible Steel, Giving About Percentage of Carbon They Should Contain.

	Carbon.	
A.		
Arbor, saw	0.60 to 0.70	Mild tool temper.
Auger, salt	0.70 to 0.80	Spring temper.
Auger, wood	0.70 to 0.80	Spring temper.
Axe	1.20	Hard tool temper.
Axe, broad	1.15	Medium tool temper.
Axe, overcoat	1.15	Medium tool temper.
Axe, stone	0.80 to 0.85	Mild tool temper.
B.		
Ball bearing	1.20	Hard tool temper.
Ball bearing plates	1.15	Medium tool temper.
Back, butcher	0.80 to 0.90	Mild tool temper.
Barrel, gun	0.60 to 0.70	Hammer temper.
Bits, auger	0.50 to 0.65	Hammer temper.
Bits, axe	1.10 to 1.15	Medium tool temper.
Bits, channeling machine	1.15	Medium tool temper.
Bits, jointer	1.20	Hard tool temper.
Bits, mining	0.80	Mild tool temper.
Bits, saw	0.80	Mild tool temper.
Bits, scarf	1.22	Hard tool temper.
Bits, tong	1.15	Medium tool temper.
Bits, well, for stone drilling	0.80 to 0.84	Tough tool temper.
Bits, artesian well	0.80 to 0.84	Tough tool temper.
Bites, plier	1.00 to 1.10	Medium tool temper.
Blade, table	0.70	Mild tool temper.
Blade, knife	1.15	Medium tool temper.
Blade, pocket	0.90	Mild tool temper.
Blade, reamer	1.20 to 1.22	Hard tool temper.
Blanks, milling cutter	1.15	Medium tool temper.
Bolts, set	0.60 to 0.70	Mild tool temper.
Bushing, spring	0.80	Spring temper.
C.		
Canes for hitting and missing devices on gas engines	0.80	Mild tool temper.
Carriers, gun	0.60 to 0.70	Tough hammer temper.
Carver	1.00 to 1.10	Medium tool temper.
Centers, lathe	0.80 to 0.90	Mild tool temper.
Chisels for cutting files	1.20	Hard tool temper.
Chisels, chipping	1.10	Medium tool temper.
Chisels, clay	0.80 to 0.90	Tough tool temper.
Chisels for hot work	0.60 to 0.70	Mild tool temper.
Chisels, railroad track	0.85	Mild tool temper.
Chisels, blacksmiths' cold	0.85	Mild tool temper.
Chisels, stone cutters'	0.80 to 0.85	Mild tool temper.
Chisels, wood working	1.20 to 1.22	Hard tool temper.
Chisels, brick	0.60 to 0.70	Mild tool temper.
Claw bars (pulling spikes)	0.65 to 0.75	Mild tool temper.
Cone, bicycle	0.70 to 0.80	Mild tool temper.
Creaser	1.20 to 1.25	Hard tool temper.
Cruciform drill	0.95 to 1.10	Medium tool temper.
Cups, boiler makers'	0.60 to 0.70	Mild tool temper.
Cutters, flue	1.20 to 1.25	Hard tool temper.
Cutters, glass	1.20 to 1.25	Hard tool temper.
Cutters, milling	1.20 to 1.25	Hard tool temper.
Cutters, nail	1.20 to 1.25	Hard tool temper.
Cutters, corn stalk	0.80 to 1.00	Medium tool temper.
Cutters, pipe	1.20 to 1.25	Hard tool temper.
Cutters, tong	1.20 to 1.22	Hard tool temper.
D.		
Dies, bolt	0.60 to 0.70	Mild tool temper.
Dies, blanketing (bottom dies)	0.85 to 0.90	Mild tool temper.
Dies, cartridge shell	1.20 to 1.22	Hard tool temper.
Dies, clever link	0.85 to 0.90	Mild tool temper.
Dies, cold heating	1.15	Medium tool temper.
Dies, cutlery	0.80 to 0.85	Tough tool temper.
Dies, envelope	1.15	Medium tool temper.
Dies, drop forging	0.85 to 0.90	Mild tool temper.
Dies, drop forging, for making table knives	0.68 to 0.78	Mild tool temper.
Dies, hammer	0.67 to 0.78	Mild tool temper.
Dies, horseshoe (cold punching)	1.20 to 1.22	Hard tool temper.
Dies, glove	0.85 to 0.90	Mild tool temper.
Dies, nail	1.15	Medium tool temper.
Dies, paper cutting	1.15	Medium tool temper.
Dies, pipe	1.15 to 1.22	Medium tool temper.
Dies, rivet	0.60 to 0.70	Tough hammer temper.
Dies, shoe	0.70 to 0.80	Soft tool temper.
Dies, silver spoon	0.85 to 0.90	Medium tool temper.
Dies, silversmiths'	1.15	Medium tool temper.
Dies, tong	1.10 to 1.18	Medium tool temper.
Dies, wire drawing	1.20 to 1.22	Hard tool temper.
Dies for pointing machine	1.15	Medium tool temper.
Dies for manufacture of files	0.67 to 0.78	Bit temper.
Digging bars	0.85 to 0.90	Mild tool temper.
Dog, cant	0.90 to 1.00	Spring temper.
Drills for drilling tool steel shear knives	1.15 to 1.20	Hard tool temper.
Drills for boring out shotgun barrels	1.10	Very hard tungsten temper.
Drills, star	1.10	Medium tool temper.
Drills, quarry	1.10 to 1.18	Medium tool temper.
Drills, twist	1.20 to 1.22	Hard tool temper.
Driver, screw	0.60 to 0.70	Tough hammer temper.
E.		
Edge, straight	1.05 to 1.12	Medium tool temper.
Expander sections	1.20 to 1.22	Hard tool temper.
F.		
Facing, anvil	0.85 to 0.90	Mild tool temper.
Feather	0.60 to 0.70	Hammer temper.
File, cabinet	1.20 to 1.25	File temper.
File, cant saw	1.25 to 1.30	File temper.
File, Great American cross cut	1.25 to 1.30	File temper.
File, pillow	1.25 to 1.30	File temper.
File, slim taper	1.25 to 1.30	Hard tool temper.
Fork	0.90 to 1.10	Spring temper.
Fork, carver	0.58 to 0.62	Soft tool temper.
Furnace bars	0.60 to 0.70	Soft tool temper.
Flatters	0.60 to 0.70	Mild tool temper.
G.		
Glut	0.60 to 0.70	Hammer temper.
Grab	0.70 to 0.90	Soft tool temper.
Grips in tube works	0.85 to 0.90	Soft tool temper.
H.		
Hammer, bush	1.25 to 1.30	Hard tool temper.
Hammer, blacksmiths'	0.67 to 0.78	Soft tool temper.
Hammer, bush for granite	1.15	Medium tool temper.
Hammer, machinists'	0.90 to 1.00	Medium tool temper.
Hammer, nail machine	1.05 to 1.10	Medium tool temper.
Hammer, peen	1.15	Medium tool temper.
Hammer, pneumatic	0.60 to 0.70	Mild tool temper.
Hammer, ball peen	0.80 to 0.85	Soft tool temper.
Hardies	0.60 to 0.70	Soft tool temper.
Hatchet	1.15 to 1.22	Hard tool temper.
Hoe	0.85 to 0.90	Spring temper.
Holders, tool	0.85 to 0.90	Soft tool temper.
Hook, cant	0.85 to 0.90	Spring temper.
Hook, cant, for hammer dies	0.68 to 0.78	Bit temper.
Hook, grass	0.60 to 0.70	Spring temper.
Husks for dies	0.85 to 0.90	Soft tool temper.
J.		
Jar	0.73 to 0.78	Bit temper.
Jaw, chuck	0.85 to 0.90	Soft tool temper.
Jaw, gripping	0.85 to 0.90	Soft tool temper.
Jaw, vise	0.85 to 0.90	Soft tool temper.
Jaw for pipe machine	1.15	Medium tool temper.
Jaw, wire puller	1.10 to 1.18	Medium tool temper.
K.		
Key for hammer	0.75 to 0.80	Soft tool temper.
Knife, belt	0.80 to 0.85	Soft tool temper.
Knife, blade	1.15	Medium tool temper.
Knife, scarfing	0.90 to 0.95	Soft tool temper.
Knife, corn	0.80 to 1.00	Medium tool temper.
Knife, draw	1.20 to 1.22	Hard tool temper.
Knife, envelope	1.20 to 1.22	Hard tool temper.
Knife, hog	1.15	Medium tool temper.
Knife, machine	1.20 to 1.22	Hard tool temper.
Knife, paper	1.15	Medium tool temper.
Knife, pug mill	1.05 to 1.10	Medium tool temper.
Knife, shear	0.85 to 0.90	Mild tool temper.
Knife, whittler	1.15	Medium tool temper.
Knife, wood working	1.15 to 1.20	Hard tool temper.
Knife, carver	1.00	Medium tool temper.
Knife, putty	0.90 to 1.00	Medium tool temper.
Knife, straw cutter	0.80 to 0.90	Soft tool temper.
L.		
Lining for brick dies	1.20 to 1.25	Hard tool temper.
Links, valve	0.60 to 0.70	Hammer temper.
M.		
Magnet for telephones	1.10 to 1.17	Hard tungsten temper.
Magnet	1.23 to 1.25	Hard tool temper.
Mandrel	1.05 to 1.10	Medium tool temper.
Mauls	0.65 to 0.75	Mild tool temper.
Mauls, wood choppers'	0.70 to 0.75	Mild tool temper.
Molds, carbon	0.87 to 0.95	Bit temper.
Molds, brick	0.80 to 0.90	Spring temper.
Machinery, crucible	0.55 to 0.65	Hammer temper.
Mattock	0.60 to 0.80	Hammer temper.
Mower, lawn	1.00	File temper.
N.		
Nut cracker and pick	0.70 to 0.73	Spring temper.
P.		
Pick	0.70 to 0.80	Soft tool temper.
Pick, mill	1.20 to 1.22	Hard tool temper.

Piercers for nail machine	1.10	Medium tool temper.
Pinch bars	0.75 to 0.85	Mild tool temper.
Pin, crank	0.55 to 0.65	Hammer temper.
Pin, eye	0.75 to 0.80	Soft tool temper.
Pin, drift	0.60 to 0.70	Soft tool temper.
Pin, expander	1.00 to 1.10	Medium tool temper.
Pin, lever	1.05 to 1.10	Medium tool temper.
Pitching tool	0.80 to 0.85	Soft tool temper.
Pivot	1.05 to 1.10	Medium tool temper.
Planer, stone	0.70 to 0.80	Mild tool temper.
Planer, wood	1.15	Medium tool temper.
Plates, guard	0.90 to 1.00	File temper.
Plates for brick dies	0.85 to 0.90	Mild tool temper.
Plate, throat, for hog	0.85 to 0.90	Mild tool temper.
Plate, tool	0.90 to 0.95	Mild tool temper.
Plow, crucible, for bicycle road scraper	0.85 to 0.90	Spring temper.
Plow, ice	0.80 to 0.85	Saw temper.
Plug	0.60 to 0.70	Hammer temper.
Plungers for bolt machine	0.60 to 0.70	Mild tool temper.
Plungers	0.85 to 0.90	Mild tool temper.
Pliers	0.85 to 0.95	Mild tool temper.
Point	0.85 to 0.90	Mild tool temper.
Point, clay pick	0.85 to 0.90	Mild tool temper.
Point, piercing	1.40 to 1.50	Hard tungsten temper.
Puller, nail	1.20 to 1.22	Hard tool temper.
Punch, cartridge shell	1.20 to 1.22	Hard tool temper.
Punch, hot work	0.85 to 0.90	Soft tool temper.
Punch, file blank	1.20 to 1.22	Hard tool temper.
Punch, skate blade	0.85 to 0.90	Soft tool temper.
Punch, washer	0.80 to 0.88	Soft tool temper.
Punch, oil cloth	0.85 to 0.90	Soft tool temper.
Punch, blacksmith	0.80 to 0.85	Mild tool temper.
Punch, railroad track	0.85	Soft tool temper.
R.		
Racer, ball	0.90 to 0.95	Soft tool temper.
Rake	1.15 to 1.25	File temper.
Reins, tong	0.60 to 0.70	Hammer temper.
Ring	0.85 to 0.90	Soft tool temper.
Rods, bench	0.66 to 0.76	Hammer temper.
Rods, piston	0.70 to 0.80	Bit temper.
Rolls, expander	1.05 to 1.10	Medium tool temper.
Rolls for hitting and missing device on gas engine	0.85 to 0.90	Soft tool temper.
Rolls, loom mill	0.55 to 0.65	Roller temper.
Rolls for holding steel scrap on wooden shovel handles	0.85 to 0.90	Soft tool temper.
S.		
Saws, circular	0.80 to 0.90	Saw temper.
Saws for sawing steel	1.60	Tungsten or saw temper.
Saws, cross cut	0.85 to 1.00	Saw temper.
Saws, band	0.68 to 0.75	Saw temper.
Saws, drag	0.95	Saw temper.
Saws, pit	0.85 to 1.00	Saw temper.
Saws, mill	1.25 to 1.30	File temper.
Saws, gang	0.90 to 1.00	Saw temper.
Scarf	1.20 to 1.25	Hard tool temper.
Scrapers, road	0.60 to 0.70	Mild tool temper.
Scrapers, tube	1.20 to 1.22	Hard tool temper.
Screws on elevators	0.85 to 0.90	Soft tool temper.
Screws, set	0.65 to 0.75	Mild tool temper.
Sets, rivet	0.65 to 0.75	Mild tool temper.
Sets, button	0.65 to 0.75	Mild tool temper.
Scythe edge	1.20 to 1.22	Hard tool temper.
Shafts for skull cracker crane	0.60 to 0.70	Mild tool temper.
Shafts, quick running motor	0.55 to 0.65	Tough temper.
Shear, pruning	0.85 to 0.90	Soft tool temper.
Shear, sheep	0.96	Soft tool temper.
Shim	0.60 to 0.70	Hammer temper.
Skate	1.15	Medium tool temper.
Sledge	0.65 to 0.75	Mild tool temper.
Slides	1.20 to 1.22	Hard tool temper.
Snaps	0.60 to 0.70	Mild tool temper.
Spindle	0.55 to 0.65	Hammer temper.
Spring, common locking	1.20 to 1.25	Spring temper.
Spring, knotter	1.20 to 1.25	Spring temper.
Spring, railroad	0.90 to 1.10	Spring temper.
Spring, locomotive	0.90 to 1.10	Spring temper.
Steel, carver	1.40	File temper.
Stretching bars	1.27	Chromium temper.
Swages, saw	0.85 to 0.90	Soft tool temper.
T.		
Taps	1.20 to 1.22	Hard tool temper.
Taps, nut	1.15	Medium tool temper.
Taps, spindle	1.20 to 1.22	Hard tool temper.
Teeth, cat wheel	0.85 to 0.90	Soft tool temper.
Teeth, dredge bucket	0.75 to 0.83	Bit temper.
Teeth, shovel	0.60 to 0.70	Mild tool temper.
Teeth, saw	0.85 to 0.90	Soft tool temper.
Tip	0.70	Hammer temper.
Tongs	0.90 to 0.95	Soft tool temper.
Tongs, ingot	0.85 to 0.95	Soft tool temper.
Tongs, skidding	0.85 to 0.90	Soft tool temper.
Tool for turning hard rubber	1.05	Chromium temper.
Tool for turning hard tires	0.96 to 1.05	Medium chromium temper.
Tool for reaming inside of guns	1.05 to 1.12	Medium chromium temper.
Tools, bricklayers'	0.90 to 0.95	Soft tool temper.
Tools, blacksmiths'	0.60 to 0.70	Mild tool temper.
Tools, molders'	1.25 to 1.30	Hard tool temper.
Trowel	0.40 to 0.45	Tough temper.
V.		
Vises	0.90 to 0.95	Soft tool temper.
W.		
Wedge, crucible	0.66 to 0.76	Hammer temper.
Wedge, stone	0.65 to 0.76	Mild tool temper.
Wedge for breaking frozen ore	0.60 to 0.70	Mild tool temper.
Wreath, crucible	0.66 to 0.76	Hammer temper.
Wrenches	0.80 to 0.90	Soft tool temper.
Wrenches, track	0.80 to 0.90	Soft tool temper.

The Edison Storage Battery.

Thomas A. Edison contributes an article to the July issue of the *North American Review*, entitled "The Storage Battery and the Motor Car," in which further information is given as to the new type of storage battery upon which he is working. It is stated that the battery has sustained and overcome the four thorough tests applied to it, and it is now undergoing the fifth, and last, with every prospect of the same result. These four tests and the fifth, now in progress, point to the new nickel-iron battery as being in fact the only real storage battery known. Mr. Edison says that the attempts to compare its performance with those of the lead storage batteries, so called, now in use in automobiles and elsewhere for lack of something better, make it not improper to declare the facts. A real storage battery must be reversible, like a dynamo, which converts power into electricity, and *vice versa*. A storage battery, to deserve the name, should be a perfectly reversible instrument, receiving and giving out power like a dynamo motor, without any deterioration of the mechanism of conversion. The present lead battery in an automobile, he alleges, does not meet this condition. It gradually becomes less and less efficient, and in a few months wholly inoperative. The acid environment prevents a proper mechanical construction, its chemical reactions are of the most capricious character; it must be watched and treated with great care—so great care, indeed, as to make it impracticable for general use. It can be made, as far as mere weight is concerned, of sufficient lightness to meet all the wants of commerce and pleasure; but if made light it rapidly becomes useless.

On the other hand, the nickel-iron storage cell has an ideal environment. Being in an alkaline solution, none of the ingredients is attacked by the solution in any degree. The chemical reactions are also of the most simple and stable character. The conditions permit of a perfect mechanical construction, and, finally, it remains uninjured under any condition which one could imagine, when in the hands of an inexpert. The weight can be made to meet every exigency of commercial vehicle traction, and up to the present time there are no signs of chemical deterioration, even in a battery which has been charged and discharged over 700 times.

Mr. Edison says he has been working for a number of years on the problem of a true storage battery. The experiments have been continuous for the past three years. The above may be considered the first stage. Tests on the battery have been going on for over a year and a half; this was the second stage. The construction of chemical works and a manufacturing plant for the cells was the third stage. The manufacture of standard cells from the tools is the fourth stage.

Twenty-one cells made in the factories, weighing 332 pounds, were placed in a Baker automobile, the total weight with two men in the vehicle being 1075 pounds. The vehicle made a run, on one charge, of 62 miles over country roads, containing many grades, some as steep as 12 feet in a hundred. At the end of this run the vehicle was making 83 per cent. of the original speed. The average speed over the entire distance was 11.2 miles per hour. On a comparatively level country road, a little heavy from recent rain, the same vehicle, on one charge, came to a stop at the eighty-fifth mile.

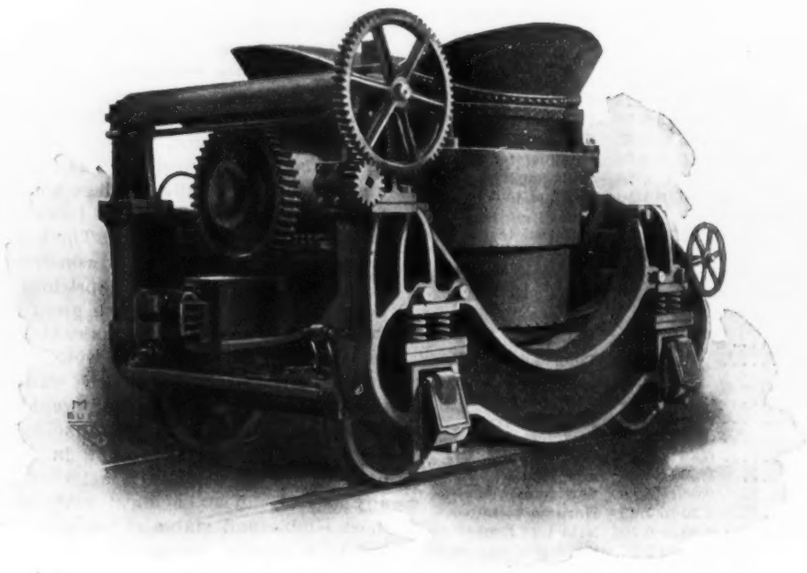
The fifth endurance test of the nickel-iron battery, which is demonstrating that the storage battery is indeed an accomplished fact, is now being made with five different models of automobiles, in each of which the new cells have been installed. They are of various weights and construction, and each of them is being

run 5000 miles over country roads, at an average distance of 100 miles per day. If these tests shall show no loss of capacity and no mechanical defect in the battery, and that it is in all respects exactly the same at the end as at the commencement, we can be reasonably assured that at last we have a real storage battery.

Mr. Edison expresses the conviction that the storage battery carriage, by the aid of the new battery, will come ultimately within the reach of the man of moderate means. Driving through the many miles of streets in the suburbs of New York, he has been impressed with the fact that something like 80 per cent. of the residences have no carriage houses. The storage battery carriage, with the new battery, should enable the owners of 40 per cent. of these residences to have a serviceable pleasure vehicle at their beck and call, without hiring a coachman to keep it clean and run it, with no horses to eat their heads off, and no oats and hay to buy. With an initial outlay of from $700 and upward, the storage battery automobile can be used once a week at the cost of a 50-cent charge, or twice for $1, and so on, the cost of use being met as it is incurred, and so ceasing to be the bugbear that fixed charges must always be to the householder of moderate income. For safe and successful use the automobile must, however, be made with heavier running gear, on the lines of the later French automobiles. Especially should stability be secured in the wheels and frame; the superstructure may be made gauzy. It seems likely that two general types of electric carriage will be developed, a light buggy type and a heavier touring carriage, the battery varying accordingly. The question of types of automobiles is further discussed, and the conclusion arrived at that the electric carriage of the future, and of the near future, will not only supersede other types of automobiles, but it will be built and run on such practical lines that accidents will soon become things of the past.

The Treadwell 15-Ton Hot Metal Car.

The car illustrated is standard gauge and is designed to carry 15 tons of molten metal for charging converters, pig casting machines, &c. The construction is such that the ladle can be moved to either side and turned on its axis by a train of gears to discharge its contents. This mechanism is similar in design and construction to that of the slag car described in our last issue. With the exception of the wheels, car boxes and brasses, the entire car is of steel. In Fig. 1 the ladle is shown in its upright position with its center line directly over the center of the track. In operating the dumping device the center line of the ladle will move away from the center of the track on that side toward which it is tipping, as indicated in the second engraving. The side and end frames are of heavy steel and, being connected, serve to make the body of the car one continuous member. The gauge is standard, and the chilled cast iron wheels, axles, journal boxes, springs and automatic couplers are of standard M. C. B. type, thereby greatly facilitating repairs. The brake can be operated by a hand wheel from either side. The ladle is of standard size, constructed of heavy plate and lined with fire brick. The car is built by M. H. Treadwell & Co., 95 Liberty street, New York.



THE TREADWELL 15-TON HOT METAL CAR.

The Duty on Boiler Plate Shearings.

WASHINGTON, D. C., July 8, 1902.—The Attorney-General has rendered an important opinion with regard to the scope of the term "scrap steel" as applied to shearings from boiler plate and other waste which may be utilized without being subjected to remelting. The case is one of special importance at this time when unusually large quantities of scrap iron and steel are being imported.

The contention which has now been finally settled arose in December, 1900, upon an importation by A. Milne & Co., at the port of New York, of a quantity of steel boiler plate shearings which were assessed for duty as "steel in all shapes not specially provided for" at the rate of four-tenths of one cent per pound, under paragraph 135 of the Tariff act of July 24, 1897. The importers protested, claiming the merchandise to be dutiable at the rate of $4 per ton of 2240 pounds, under the provisions for scrap steel in paragraph 122 of the same act. The Board of General Appraisers in ruling on the case described the contention of the Government as follows:

"The view of the witnesses on the part of the Government seems to be that the plate mill is operated for the production of two things—viz.: boiler plates and shearings, and that the scrap of refuse consists only of the pieces first removed, having a single cut edge; that as the plates are not scrap, but material for boilers so these shearings are not scrap, but the material for tacks, hinges, &c.; that as the making of the boiler from the plates is not a remanufacture but a further manufacture, so the making of tacks, &c., is not a remanufacture but a further manufacture, and that remanufacture covers only two processes: 1, melting or, 2, piling up pieces and heating and rolling them together, by which they become welded into one piece."

With this theory the Board was unable to agree, and in deciding the case in favor of the importers, it said:

"The object of the operation of the plate mill is the production of boiler plates, which are important articles of commerce especially adapted for one purpose. The pieces sheared off the sides and ends would not be produced if there were any way in which to avoid their production, and this is not more true of the pieces first sheared off, which have only one cut edge, than it is of those afterward sheared off, having four cut edges. The two processes of shearing produce two grades of scrap, neither of which has been specially manufactured with any particular purpose in view. The tack plates, produced by rolling the shearings, would be in a stage of manufacture corresponding to the boiler plates, and unquestionably would not be scrap or waste. They are material prepared for a particular use, but the merchandise as imported is not tack plates, nor has it been prepared for the purpose of producing tack plates. We are clearly of the opinion that the process to which these shearings are subjected after importation is not further manufacture, but is remanufactured, and we accordingly hold that the merchandise is waste or refuse iron or steel, fit only to be remanufactured."

An appeal from this decision was taken by the Government, but the United States Circuit Court recently affirmed the opinion of the Board, finding that the merchandise was, in fact, steel fit only to be remanufactured. The Department was in doubt as to whether this decision should be accepted as final and referred it to the Attorney-General for an opinion in connection with Treasury Decision 21,808, in which the Department with regard to a previous case had directed the collector to disregard a decision of the Board of General Appraisers and to assess an importation of so-called "scrap steel" as "steel in all forms." An examination of the decision 21,808 showed that it was based upon an understanding on the part of the Department that large quantities of so-called steel boiler plate shearings had been imported cut to specified dimensions and were used in this country as billets for the production of sheets or plates of superior quality. The Attorney-General, after a careful examination of the record in this case, has reached the conclusion that the boiler plate shearings of which the importation consisted should properly be classified as "scrap steel," and the Treasury Department upon receipt of this opinion has instructed the Collector at New York to forward a certified statement to be used as the basis for a refund of the duties exacted in excess. W. L. C.

The Engineering Company of America.—The Engineering Company of America have been incorporated under the laws of New Jersey to take over the Cunningham Engineering Company of Boston, a Massachusetts corporation with a capital of $100,000. The charter of the Engineering Company is broader than the charter of the Cunningham Company and will permit of the construction of heavy steam vehicles of 2 tons or over for commercial purposes, the development of transportation companies in different cities and the construction of apparatus for electric cars. The Cunningham charter permitted only the making of parts for vehicles. The Engineering Company of America are capitalized for $5,000,000—$2,000,000 6 per cent. noncumulative preferred and $3,000,000 common. The officers and directors of the new company are: President, Alvah Trowbridge, New York, ex-president of the North American Trust Company; vice-president, Chas. P. Smith of Fitchburg; secretary and treasurer, Fred. D. Stanley; directors: James D. Livingston, New York, vice-president Trust Company of the Republic; Marshall D. Barr of the Stanley Electric Mfg. Company, New York; D. C. Fiske, Worcester; Henry A. Belcher, Boston; H. L. Herbert, New York, and Charles B. Duffy of Worcester.

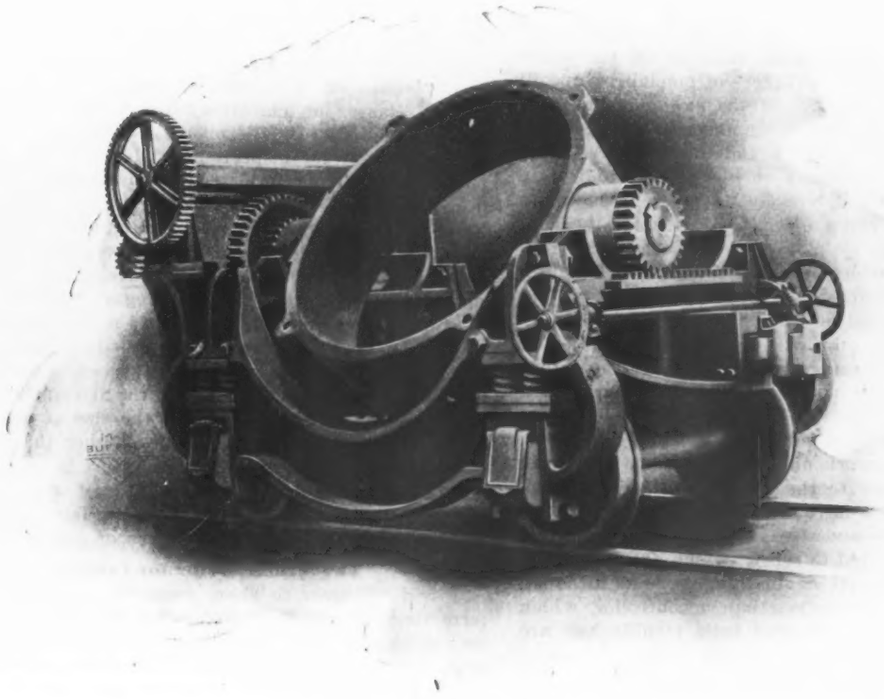


Fig. 2.—Car in Tilting Position without Ladle.

THE TREADWELL 15-TON HOT METAL CAR.

A new and interesting development in the chemical industry of the United States is the utilization of the sulphureted hydrogen gas developed as a by-product in the refining of asphaltum at the California Asphaltum Company's works at Ventura, Cal. The gas is burned to sulphurous anhydride in the usual manner and the product of the combustion conveyed to the lead chambers. Owing to the method of its production the gas is of a high degree of purity, and the acid produced is also of a high grade. At present the output amounts to 10 tons per day when the works are running at their full capacity. Sulphuric acid is made on a large scale at one other plant, while the manufacture of bluestone and boracic acid, carbonic acid, epsom salts, magnesia and numerous other products is now carried on.

The Electric Motor in Mill Work.*

BY S. S. WALES.

It is not quite ten years since the first systematic attempt was made to utilize the electric motor in rolling mill work, yet it has almost entirely superseded the small hoisting engine in many places, and has rendered some classes of work possible which if accomplished by steam would require an outfit so cumbersome as to be almost prohibitory. One of the most notable applications of electric motors, and one which has been revolutionary in mill work, is the overhead traveling crane, which is used over stock track for handling raw material, pouring steel, for handling ingots to and from the heating pits and for sorting and loading cars for shipment. To do without this crane would be a hardship, and to replace the motor by steam engine, rope drive or square shaft would be almost out of the question.

The next in importance, and in reality a brother of the crane, is the horizontal charging machine, which is used in charging open hearth furnaces and in handling large slabs and blooms to and from the horizontal heating furnaces.

Another large field of application is on the roller table, which is such a typical piece of machinery in mill work. Here the adaptability of the motor depends not so much on its lightness as on the absence of long steam pipes which act as condensers, and the complication of reversing levers. The screws on bloom, slab and plate mills are now largely driven by motors, and in up to date boiler plants, using mechanical stokers, the coal is carried to storage by motor driven conveyors, from these delivered to boilers by motor driven coal handling machines, and finally the ashes are loaded into cars by small motor driven hoists.

All the things a motor will do, or can be subjected to without material damage, and why, is for the future to decide. I have seen motors do good work surrounded by the most ideal conditions, and have also seen them give endless trouble in apparently the same conditions. I have seen motors work under conditions which were diametrically opposed to the theory of their construction and operation. I have to-day two 50 horse-power, four 5 horse-power and two 3½ horse-power series motors, direct connected to screw, which are brought to a stop by being driven against ingots, and although they have no other protection than a controller, which is operated by hand, they give little trouble and are seldom, if ever, burnt out.

Overworking Electric Motors.

The electric motor is the most conscientious machine ever designed. This trait alone has laid it open to much abuse, with the result that many of the effects of overwork have been charged against it as constitutional defects. A motor is constructed with the intention that the armature shall turn, and if properly connected turn it will or wreck itself in the attempt. Granting that it can turn with the load it is given to carry, it will continue to do the best it can until almost burned up. The fact that a motor will run even with an injurious overload, coupled with a general misconception of the meaning of the manufacturer's rating, has resulted in the general application of motors much too small for their work, and this, too, by engineers who would never think of falling into the same error with the steam engine. Further, firms who build motor driven machinery, on account of close competition, almost uniformly underestimate the size of motor required for the work, although their calculations of actual power required may be perfectly correct. The motor specified will certainly do the work at the acceptance test of the machine, but may break down in less than two weeks of factory operation, by which time the machine is probably paid for, and it lies entirely with the purchaser to keep up the constant repairs required or to make such changes as are necessary to adapt the next larger size motor to the machine. Wherever this state of affairs exists the latter course should be followed if possible, as the constant replacing of burnt out armatures and fields soon eats up the cost of the larger machine, in addition to loss in time and unreliable service.

The surest way to avoid this difficulty in most cases is for the electrical engineer in charge of the work to specify the type and minimum capacity of each motor that he will accept, thus freeing this vital part of the machine from the competitive reduction in size to which it would otherwise be subjected.

The Steel Railway Motor.

Motors for mill use may be of any or every type built, but in any case it is probable that no single type would cover the ground satisfactorily under all conditions. All have their able advocates, whose reasoning is very convincing to others and perfectly satisfactory to themselves. At the present time no motor has had such diversified application in this line as the standard street railway series motor, its claim for recognition being the powerful starting effort, its complete mechanical protection from external damage, and the fact that it is a standard article turned out in large numbers from the electric companies and therefore can be obtained on short notice. Its drawbacks are its high speed at very light loads and its lack of ventilation. The writer is inclined to favor this type for a large proportion of mill work, though not averse to the open type series, shunt or compound wound motor for driving certain classes of machinery for which they are especially well fitted. The open type has the advantage of easy access for inspection or cleaning, but it offers no protection from foreign substances, small pieces of iron, crowbars, &c., which are very likely to come within its field of attraction during ordinary mill operation.

In the earlier days of electric power development a great deal of reluctance was shown by the manufacturers of electrical apparatus in regard to giving detail of performance of their motors to the prospective user. This led to series motors being applied to work at their nominal rating as to output and speed, which would uniformly result in overload, or if the attempt was made to reduce the load by increasing the size of motors the speed of operation would be much higher than the figures showed. At the present time there is no difficulty in obtaining complete characteristics of any standard motor on the market, so that sizes can be specified and results predicted with a fair degree of certainty.

The Size of Motor for Cranes.

I will endeavor to show some easy methods of determining the proper size of motor for such work as is ordinarily met with in mill use, such as cranes and tables, not claiming absolute accuracy, but feeling that by following along these lines the user will be on the safe side, although he will often be told he has figured too high. As in a general crane specification the actual weights of material and gear reduction, &c., are not known, some arbitrary assumptions will have to be made and some empirical formula will be used, but as both are founded on facts and experience some reliance may be placed in them. An electric crane is divided into three general parts—bridge, trolley and hoist—each of which has its own motor and controlling system, and each subjected to different conditions of work.

For the bridge, where the ratio of axle bearings to diameter of wheel is between one to five and one to six, the following table will answer our purpose for weights and traction for different spans:

Let L equal working load of crane in tons, W equal weight of bridge alone in tons, w equal weight of trolley alone in tons, S equal speed in feet per minute, P equal pounds per ton required.

Span.	W.	P.
25 feet	0.3 L	30 pounds
50 feet	0.6 L	35 pounds
75 feet	1.0 L	40 pounds
100 feet	1.5 L	45 pounds

For the trolley we would assume the weight and traction as shown in the following table:

L.	W.	P.
1 to 25 tons	0.3 L	30 pounds
25 to 75 tons	0.4 L	35 pounds
75 to 150 tons	0.5 L	40 pounds

* A paper read before the Engineers' Society of Western Pennsylvania.

Now the power required for bridge will be $\frac{(L + W + w) \times P \times S}{33{,}000}$ = horse-power, which result will be used in connection with the motor characteristic to determine the gear reduction from motor to track wheel. As the nominal horse-power rating of a series motor is based on an hour's run with a rise of 75 degrees C. above the surrounding air, and as conditions of bad track, bad bearings or poor alignment of track wheels may be met with, in factory operation one and one-half times the above result should be taken as the proper size motor for the bridge.

For the trolley the power required would be $\frac{(L + w) \times P \times S}{33{,}000}$ = horse-power which will be used for speed and gear reductions, but one and one-quarter times this should be used for size of motor.

For hoist work we cannot have so large margin of power, as the variation from full load to no load may imply a possible dangerous increase of speed, and unless the crane is to be subjected to its maximum load continuously or is to be worked where the temperature of the surrounding air will be high it is safe to determine the size by assuming 1 horse-power per 10 foot tons per minute of hoisting. This is nearly equal to assuming the useful work done as 60 per cent. of the power consumed.

As an illustration, let us take a crane of 50-ton capacity, lifting speed of hoist 15 feet per minute. Bridge to be 70 feet span and to run 200 feet per minute with load. Trolley to travel 100 feet per minute with full load. On the foregoing assumption the bridge would weigh 50 tons and require 40 pounds per ton for traction, and the trolley would weigh 20 tons and require 35 pounds per ton for traction.

The power for the bridge would be $\frac{120 \times 40 \times 200}{33{,}000} = 29$ horse-power, and the size motor one and one-half times this would give 43½ horse-power, or 50 horse-power, this being the nearest standard size, and the specifications should read not less than 50 horse-power to be used for bridge travel.

Assuming Westinghouse motors to be used, as they are more commonly known in this district, this would call for a No. 38—50 horse-power railway motor. By referring to characteristic sheet for this type we find that at 29 horse-power this armature will run 612 revolutions per minute, which, when the diameter of the wheel is known, will give the gear reduction needed.

Similarly the trolley will require $\frac{70 \times 35 \times 100}{33{,}000} = 7.43$ horse-power, and the size motor required will be one and one-quarter times this, or 8.28 horse-power, or 10 horse-power, dust proof, as the next standard size, and the specification would read not less than a 10 horse-power motor to be used. The characteristic of a Westinghouse 10 horse-power motor shows that the armature will run 820 revolutions per minute at 7.43 horse-power. The hoist would require $\frac{50 \times 15}{10} = 75$ horse-power, and would be specified not less than 75 horse-power motor to be used on the hoist. The next standard size Westinghouse motor suitable for crane service is the No. 76, rated at 80 horse-power at 220 volts, and the armature speed at 75 horse-power is shown on the characteristic to be 460 revolutions per minute. The required power will, of course, be modified by the requirements of special cases, the use of rope or chain, whether the reduction is made mostly in the chain or in the gearing, &c., but still they will give reliable results to the user.

The Size of Motor for Roller Tables.

The power required by roller tables in mill work varies greatly, as they are subjected to tight bearings and lack of oil to a greater extent than electric cranes, and as there will be from two and one-half to three bearings to each roller and many rollers per table, these chances for trouble are greatly multiplied.

For the average conditions of mill tables, where each roller is driven by a miter gear from a common line shaft and with usual mill lubrication, the following empirical formula derived from the test of 20 tables represents about the power required:

$$\frac{W \times D \times S \times N}{950{,}000} = \text{horse-power.}$$

Where W equals weight of roller in pounds, the load to be carried on table being considered as uniformly distributed over all rollers 1 N to each; D equals diameter of bearings in inches, S equals speed of table in revolutions per minute of rollers, N equals number of rollers in table.

The same one and one-half times power required for size of motors should be taken as for crane bridges.

This takes no account of diameter of roller used, which would, of course, have some effect on the power required to move the load to be handled and would also show some fly wheel effect when starting, but still it will check fairly well with tables now in use under existing conditions, two examples of which are given here: N equals 18, W equals 1600 pounds, D equals 4½ inches, S equals 200 revolutions per minute. Diameter of roller 10 inches.

$$\frac{1600 \times 4\frac{1}{2} \times 200 \times 18}{950{,}000} = 27.2 \text{ horse-power.}$$

From actual test under working conditions this table required 28.8 horse-power, and the nearest Westinghouse motor being No. 38—50 horse-power—this type should be used. The characteristic of the No. 38 at 27.2 horse-power shows an armature speed of 632 revolutions per minute, which would show a reduction of about 3.2 to 1 from armature to roller. As a matter of fact, this table is equipped with a 30 horse-power motor and is the source of continual annoyance from overload.

N equals 16, W equals 1000 pounds, D equals 3 inches, S equals 110 revolutions per minute:

$$\frac{1000 \times 3 \times 115 \times 16}{950{,}000} = 5.8 \text{ horse-power.}$$

By actual test 5.5 horse-power was required.

As mill operators become more familiar with proper handling of motors and engineers become more liberal in specifying sizes the electric motor is destined to fill a still larger field in mill work than is even now thought of.

Central Pennsylvania News.

HARRISBURG, PA., July 8, 1902.—One of the remarkable conditions of the iron and steel industry in this part of the State is that the summer shutdowns will be of shorter duration than usual, and that every manager who can will run his works until repairs are absolutely necessary. This State of affairs is due to the pressure of orders and to the desire to get work out of the way before more serious conditions grow out of the coal strike. Stocks of fuel are short and as a consequence the materials are hard to get and there will be few suspensions for stock accounting this summer.

The Penn Iron Works at Lancaster have settled labor troubles and the mill has resumed operations with a full force of men. The same rate is being paid as at other mills. The Duncannon Iron Company have granted a $4.50 per ton rate to puddlers, and it is now general throughout Central Pennsylvania.

The Seaboard Steel Casting Company last week shipped from their Chester works 26 castings for the Eastern Shipbuilding Company at New London, Conn. They are said to be about the largest made in this State, if not in the country, as one piece is 24 feet long, while there are two rudders weighing almost 50 tons apiece.

The Harrisburg puddle mills are now paying $4.50 per ton, the highest in ten years. An advance has also been given to the men in the Chesapeake Nail Works.

The Reading Stove Works, operated by Orr, Painter & Co., will make some improvements. $100,000 of preferred stock having been subscribed. The works have had a very busy season.

One of the Sheridan furnaces has been blown out for repairs and because of the scarcity of fuel.

The Central Iron & Steel Company have put three more furnaces in operation in their 126-inch mill, increasing the output to 140 tons per day. The mill has

three furnaces on gas and three on coal, and has been making some big plates.

The Middletown Works of the National Tube Company have suspended operations for ten days for summer repairs. The works have been making a busy season and the product has been largely used for export. The works are employing one of the largest forces in their history.

There are persistent rumors here and at Lebanon that the Pennsylvania Steel Company will enlarge their interests in the Lebanon valley. The company now have control of a large interest in the Cornwall ore hills and two furnaces, and report has it that the company may lease or buy Robesonia Furnace, whose product they are now taking to a great extent.

The Glasgow Iron Company have in contemplation the erection of two open hearth steel furnaces of 50 tons capacity.

The Heilner Foundry at Lansdale are preparing to resume operations, a long strike having been settled. S.

Our Shipbuilding Industry

WASHINGTON, D. C., July 8, 1902.—The Bureau of Navigation has compiled some interesting figures, showing the shipbuilding in the United States during the fiscal year ended June 30, 1902, from which it appears that 1657 vessels of 473,981 gross tons were built and officially numbered, compared with 1709 vessels of 489,616 tons for the previous fiscal year. The result in some respects is disappointing, as the indications last July were that the fiscal year would break the recent records and come close to the total of 583,450 tons in 1855, the greatest year of American shipbuilding.

While the total figures are less than was expected a year ago, the results in many particulars show satisfactory progress. The steel vessels built and officially numbered this year are 130, of 284,702 tons, compared with 121, of 260,253 tons, for the previous year. There has thus been an increase of about 10 per cent. in the construction of steel vessels and in the consumption of steel for shipbuilding. The year's total, indeed, would have been considerably exceeded had there not been delays in the supply of structural steel, due in part to the great strike in the steel trade last summer and in part to the very heavy demand throughout the country for steel for architectural and railroad purposes.

The following table shows the steel construction during the fiscal year 1902 as compared with 1901:

	1901.				1902.			
	Sail.		Steam.		Sail.		Steam.	
	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf	12	13,752	51	90,476	8	9,223	62	102,647
Pacific	..	....	6	7,607	..	....	2	10,707
Great lakes	5	11,236	46	136,620	..	....	52	161,797
Western rivers	..	....	1	562	..	....	6	328
Totals	17	24,988	104	235,265	8	9,223	122	275,479

Up to a few years ago the building of an ocean steel steamer of 5000 tons was a rare event in this country, and the two American mail steamers, "St. Louis" and "St. Paul," of 11,600 tons each, built in 1895, have been isolated evidence of the possibilities of American shipbuilding. During the last year, however, the transatlantic liner "Kroonland," of 12,760 tons, has been finished by the Cramps, and her sister, the "Finland," though not near enough to completion to be included in this fiscal year's returns, is expected to be put into operation in September. At Newport News the Pacific Mail steamship "Korea," of 11,275 tons, has been completed, and the sister ship "Siberia" will make her initial voyage in the autumn. The "Korea" is the largest and fastest merchant steamer upon the Pacific. The Newport News yard has also completed three steamers of 4600 tons each for the Morgan Line, thus finishing the renovation and extension of that important fleet which has been in progress since the close of the war with Spain.

The Maryland Steel Works have completed the sister ships "Shamut" and "Tremont," of 9600 tons each, by far the largest cargo steamers ever built in the United States. It is somewhat doubtful if steamers of such proportions would have been ordered had it not been supposed at the time that the Subsidy bill would pass, and that they could be put into the transatlantic trade. They are to be sent to the Pacific Coast to open the line between Seattle and the Philippines, which, after 1904, will have the benefit of our coasting laws. The Maryland Steel Company are making a specialty of cargo steamers, and if these two vessels prove successful that yard will doubtless be the first to obtain the considerable benefits of shipbuilding involved in the application of the coasting laws to the Philippine trade.

The Union Iron Works, at San Francisco, have finished the "Alaskan," of 8671 tons, the largest steamer which ever plunged from the ways into the waters of the Pacific. Besides the "Alaskan," the American-Hawaiian Steamship Company have had completed at the Camden Shipyard the "Nevadan" and "Nebraskan," of 4400 tons each, and fair progress has been made with the "Texan" and "Arizonian" for the same line, which are to be sister ships of the "Alaskan." The Camden yard has also turned out the "J. M. Guffey," of 2500 tons, for the oil trade between Texas and North Atlantic ports. The construction of vessels for this trade promises to be a feature of steel shipbuilding during the next 18 months.

The shipyards of the great lakes continue to be the greatest consumers of steel. During the year 52 steel steamers, of 161,797 tons, have been built on the lakes, a product greater than the entire output of the shipyards of any foreign country, except the United Kingdom or Germany. The lake yards are almost wholly devoted to building large steamers. Thus, of the tonnage mentioned, 158,631 tons represent 41 steel steamers. Vessels under 2200 or 2300 tons pass through the locks of the Canadian canals without difficulty. This year two steamers approaching this tonnage were built for the West Indian fruit trade and one for the coasting trade. The "Minnetonka" and "Minnewaska," vessels of nearly 5300 tons each, were built at Cleveland, documented, cut in two to pass the Canadian canals, with a view to subsequent reassembling. An accident to the first steamer, however, has delayed the arrival of either at the seaboard, and it yet remains uncertain whether this method of construction is to be a permanent feature in the maritime development of the United States.

Two steel full-rigged ships, the "William P. Frye" and "Atlas," of 3380 tons each, have been built during the year, and the definite conclusion of the Sewalls of Bath, Maine, to abandon wood and build hereafter entirely of steel, is a noteworthy event to the steel interests of the country. The first large steel schooner, "Providence," 1650 tons, built at Camden, also marks a departure in the shipbuilding in the United States.

The outlook for shipbuilding during the current fiscal year is not so promising as it was 12 months ago. Very few contracts for large ocean steamers have been reported, and as large steamers now on the ways are launched there is little indication of new work to take their places. A year ago 255,000 tons of ocean steel steamers were under construction or contract. Of this about 100,000 tons have been finished, so that there remains only about 160,000 tons of work on hand for the new year. W. L. C.

The credit of having reached the highest altitude on record is given to Dr. Bersen and Dr. Suring of Berlin. They first went up to the hight of 30,000 feet, losing consciousness for brief intervals. They continued to ascend to 33,790 feet, when one of them became completely unconscious and could not be aroused. The other aeronaut, after making a great effort in opening the valve to descend, also became insensible, and neither of them recovered till the balloon dropped to 16,000 feet.

Conferences between the officers of the American Tin Plate Company and the officers of the Amalgamated Association over the foot notes to the tin plate scale are still proceeding. An early agreement is expected.

Canadian News.

British Columbia's Iron Resources.

TORONTO, July 5, 1902.—The committee appointed by the Voters' League at Victoria, B. C., to prepare a statement of the conditions for the manufacture of iron and steel in the Province has submitted a long report. Of the ore deposits it says:

"Very large deposits of magnetite ores are to be found within the districts of Victoria, Alberni Coast, Nanaimo, Bella Coola, Cariboo, Similkameen, Kamloops and Queen Charlotte Islands. Hematite also exists, the extent of which remains as yet a matter of conjecture. Prospectors are now looking up these properties and fuller information will be available to your committee within a short time.

"Of the developed properties, upon which a value from an economic standpoint may be based, those of the Texada Island may be cited. It is here the Puget Sound Iron Company own 2700 acres situated on the southwest side of the island. Sufficient development has taken place to expose an ore body estimated by experts as representing 8,000,000 tons of commercially valuable iron, which gives a detailed test of from 68 to 70 per cent. iron, and comparatively free from objectionable properties. Arrangements have been made to transport this ore by a gravity tramway 1100 feet in length and 500 feet above sea level, with the intention of making regular shipments to the smelter at Irondale, Washington. Here the ore is subjected to a mixture of from 1-9 to 3-10 of bog ore obtained near Hamilton, Skagit County. From this an excellent foundry pig is made, and was utilized in building the United States war vessels "Olympia," "Monterey," "Charleston" and "Oregon," by the Union Iron Works Company of San Francisco. Experts have pronounced this a superior article to the Eastern manufacture, and it is certainly a compliment to the British Columbia magnetite ores. Of other properties upon which development work has taken place mention may be made of the Serata, with an ore body of 80 feet wide, a depth of 90 feet, with an easterly extension of considerable distance; over 800 feet has been crosscutted with excellent results. The Copper Island and Sheshart have each an ore width of over 100 feet; a tunnel has been made at the latter of 200 feet wide, with a depth of 800, a very extensive body of limestone lying contiguous to this property. On the Copper Island a tunnel has exposed a vein from 15 to 20 feet, assaying 60 per cent. iron and no impurities. This has been traced for over half a mile, and described as one of unlimited supply. Hermatite deposits lie in close proximity. These mines are situated in the Barkley District and are bonded by an American syndicate who expect within a short time to expend $3,000,000 in the erection of smelter and rolling mills. The Redonda mine is situated on the north shore of West Redonda Island, the north shore of which rises abruptly from the sea to a hight of over 3000 feet. The ore outcrop is situated at an altitude of 450 feet, a foothold to this rapid rise being afforded only by the standing timber. In 1893 623 tons of magnetite ore were shipped to the Oswego Iron & Steel Company's furnaces in Oregon. This work exposed an open face of solid magnetite 30 feet wide by 30 feet in hight, assaying 66 per cent. per ton. No further work has been recorded, and owing to the peculiar situation, little is known of the extent of this deposit.

"The Glen iron mine at Cherry Bluff, near Kamloops, on the line of the C. P. R., is another which has produced in a small way. The product of this mine is of excellent quality, 66-83 per cent. metallic iron, and the annual output of from 500 to 2000 tons being conveyed by aerial tramway to the C. P. R. tracks. This ore has been extensively used for flushing purposes by the smelters of Tacoma, Revelstoke and Nelson. The estimated ore in sight being given at 2,000,000 tons.

"The Kootenay River deposits reported by Dr. Dawson are quite extensive, and are of a magnetite character; their situation renders them of little commercial value, lacking facilities for cheap transportation.

"Another extensive deposit of a hermatite formation was discovered by Mr. Ludloff, a German geologist, in the Cariboo District. This measures 500 feet in thickness, and, like the former mine, is of little value with the present means of communication.

"At Port Renfrew a vein of 100 feet in width has been located, and this is situated some 7 miles from tide water and assays 68.8 per cent. iron.

"A tunnel at Rivers Inlet 100 feet wide with a corresponding depth has exposed a vein of 30 feet width, assaying some 69 per cent. iron. Little is known by record of the two latter deposits beyond that here stated.

"In addition to the forementioned properties, deposits of a more or less extensive nature have been discovered at Sooke, Chemainus, Toba and Knight's Inlets, Comox, Nootkat Sound, Bella Coola, Alberni, Graham and Moresby Islands, Similkameen and other points, showing conclusively that iron ore deposits are not confined to any particular locality. It is an undoubted fact that immense bodies of both magnetite and hermatite lie awaiting development the moment demand and favorable conditions exist for iron and steel production."

Of the quality, cost of mining, shipping facilities, prospective markets, &c., a very detailed and favorable account is given. The report ends with the following suggestions:

1. That the Minister of Mines be asked to have the various ore bodies reported upon, that accurate knowledge be forthcoming regarding: *a*, The locality; *b*, quality of ore; *c*, the extent of deposits, and commercial value of the same.

2. The preventing of restaking of claims and speery punishment for false declaration in respect to improvements.

3. That a bill be brought down embodying the following legislation in addition to the mining laws of the province: *a*, That a bonus of not less than $——, nor more than $——, be offered prospectors for each available body of magnetite or hematite ores discovered within the province, the same being approved of by the proper officer as to quality, quantity, and availability for manufacturing purposes; *b*, that all such deposits be reserved by the Government in the interests of the owner to the intent that he be aided by the Government in obtaining full money value for his find. This prevents the owner locking up the raw materials of the province against industry; *c*, that in cases where the owner is unable to prove his find the Government shall (if considered of value) reserve and prove the same, deducting the expenses from the amount of bonus or royalty thereafter paid; *d*, the Government shall place the reserved properties in the hands of responsible parties who will deposit a bond with the Government covering a contract to mine such quantity of ore per year as shall be agreed upon smelting, or having the same smelted, within the province. That for each ton of ore mined the discoverer shall be paid a royalty, the amount of which shall be determined according to quality, quantity and the availability of the ore, the Government at all times acting as arbitrator of values. In event of an arrangement being made for the sale or purchase of a deposit outright, the purchaser shall be required to deposit a bond with the Government covering an agreement (under the law of reserve) that the material taken from such mines shall be smelted within the province.

Dispute Over Bounties.

Litigation springing out of a dispute between the Auditor-General of Canada and the Dominion Iron & Steel Company over bounty payments, has been begun. The Department of Trade and Commerce reported in favor of $196,000 being paid as bounty money to the company, but the Auditor-General stopped payment on the ground that the weight of cold pig iron and not of the hot article should be made the basis of calculation. The Auditor-General, it must be remembered, is a servant of Parliament, not an official of the Government, and he takes leave to question Government orders when they call for public money for the expenditure of which he considers there is not lawful warrant. Steps have been taken to prove whether he has judged fairly as to the justice of the company's claims. A petition of right has been granted, enabling the company to proceed against the Crown to compel payment of the money.

J. D. Thompson is proposing to the City Council at Kingston to build an iron smelter there. He asks neither bonus nor exemption, but wants the assessment to be fixed at a certain sum for a period of years.

The Canadian Pacific Railroad shops have already turned out a considerable portion of the large order placed with them six months ago. The Perth shops are making ten cars a day. They have to manufacture 800 of the total 2300 box cars called for.

The blast furnaces at Sault Ste., Marie are to be in operation in two or three months. C. A. C. J.

Trade Shipping Notes from Scotland.

GLASGOW, June 12, 1902.—The coal strike in the United States is being watched here with great interest, and also with much sympathy. This country has gone through the same mill so often that we know all about it—all about the depressing and demoralizing effect upon trade of suspension and restriction of supply of the staff of industrial life. And we are not without possibility of renewed troubles of our own in the same connection. In a recent letter I described the settlement which had been effected in Scotland by the reconstitution of the Coal Board of Conciliation upon a broader basis. The coal owners have within the last day or two applied to that board to order a reduction of 6 pence per day in wages, on the basis of the low average price now being realized. It is doubtful if the men will agree without reference to an arbiter—following the example of the miners of the Midlands of England, who have refused to accept a reduction of 10 per cent. recommended by their Board of Conciliation and have demanded reference of the whole matter to the neutral chairman, Lord James of Hereford. And while these matters are still pending, the Welsh miners are throwing up the sliding scale and threaten trouble in connection with the export duty (1 shilling per ton) and its relation to the price to which wages should be adjusted. So that in three leading coal districts of the United Kingdom labor is again in a state of unrest, though up till now not seriously. Otherwise the miners generally are putting out at a greater rate than last year and coal is in liberal supply, while shippings are not and the home consumption is tending rather to decrease. The exports fell off last month by 368,000 tons, or about 10 per cent., although the price is 22 per cent. lower than in the corresponding month of last year.

The Pig Iron Situation.

The effect of your coal strikes is being sensibly, though indirectly, felt in our iron markets, which, of course, have also been favorably affected by the conclusion of peace in South Africa. Pig iron warrants rose at once on the announcement of the Pretoria settlement, but, of course, there was the usual reaction when holders began to take their profits, as holders realized their parcels were quietly taken up, and it is believed that all the available warrants are now in the hands of one large Glasgow firm. I have observed in some papers reference to a corner. There is no corner, and there has been no attempt to squeeze bears. A good deal of the holding in Glasgow hands—especially of Cleveland warrants—is believed to be on American account. At recent settlements it has been obvious that there had been more short selling than was generally supposed, but the policy of those who now control the market is neither to allow it to run away nor to be swamped by bears. Last week fines up to 4 pence per ton per month had to be paid by sellers of Cleveland who had not the warrants to deliver when called and who had to borrow the scrip; but if the iron had been called up they might have been made to pay a difference of 10 or 15 shillings per ton. The report that the American output has declined by over 4000 tons per day in consequence of the coal strike has stiffened the backs of Scotch and English smelters. It has also stimulated the demand of home consumers afraid of getting left. There are several inquiries in the market here from America, and pig iron is going across every week by the liners from the Clyde. There are now 86 furnaces in blast in Scotland, as compared with 76 a year ago, but there are only 52,500 tons of Scotch G. M. B. in the warrant stores. In Cleveland not only is warrant iron closely held, but forge and foundry qualities are distinctly scarce, although the shipments from the Tees compare unfavorably with last year. Another steamer has just been chartered to take 3000 tons of hematite iron from the Tees to Philadelphia at, it is said, the low freight of 7 shillings per ton, which will certainly not enrich the ship owner. Other charters are being negotiated. Middlesbrough Hematite has been selling at 57 shillings for mixed numbers and Cumberland hematite warrants at 60 shillings. Little Cleveland ordinary iron is now coming to Scotland, as the current difference in price (5 shillings per ton) does not afford sufficient margin for freight and charges. This is why the total of the Tees shipments looks so poor. Yet for the year we have received 40,000 tons more from Cleveland than in the corresponding portion of last year. Stocks in the hands of both producers and consumers are so small that if there were any large increase in the shipping demand it could only be met out of the public stock, and it is firmly held. It is probable that several of the Cleveland furnaces will be turned from ordinary iron to hematite, as the current price for the former is not remunerative and is out of proportion to the selling price of ordinary iron. A rising tendency in Spanish ore is also against the hematite makers. In what is broadly known as the Cleveland district some dozen furnaces are now being rebuilt on the American pattern. When these are ready the output will be materially increased. Some of the Scotch furnaces are also about to be remodeled, and a similar process is in progress in Cumberland. The entire exports of pig iron last month were 81,818 tons, as compared with 103,630 tons in May, 1901. There was a great decline in the shipments to Germany—from 34,717 tons to 11,952 tons, and to Holland and Belgium in transit to Germany—viz., from 14,616 to 4250 and from 6316 to 4144 tons, respectively. There was also a decrease in the deliveries to Russia, France and Italy. On the other hand the shipments to the United States increased from 4651 to 23,177 tons and to Canada from 485 to 2010 tons.

The Trade in Iron and Steel.

Iron and steel manufacturers are much better employed and are hoping for better things still as a result of peace. The Scotch makers of bar iron have come to an understanding with those of the North of England to bring to an end the system of rate cutting that has been the bane of the trade too long. The Scotch makers have always had a minimum rate agreement among themselves, but now they have got their English competitors under the same conditions. An order for 1000 tons of bars has just come to a local maker from Canada, which is a large line from that quarter as things have been in recent years. Some considerable orders have also been received by Scotch steel makers from America, and the trade generally is approaching the holiday season with a more prosperous appearance than it had six months ago. In the North of England the holidays occur in June; in Scotland they occur in July. Steel ship plates are in the neighborhood of £5 15s., and there is a disposition to expect a renewal of shipbuilding orders as soon as the dead summer season is over. Big orders are looked for from South Africa for structural material, pipes and machinery, but the Government orders for fencing, wire, &c., will not cease. Quite a large tonnage of vessels engaged on war service will now be released, with a probably depressing effect on the freight markets, which may have an adverse influence presently on the iron markets. Last month our exports of bar iron were 11,348 tons, as compared with 10,326 tons in the corresponding month; railroad iron, 69,825 tons, as compared with 53,440 tons; galvanized iron sheets, 34,465 tons, as compared with 22,708 tons; tin plates, 26,596 tons, as compared with 19,136 tons; wire, 4976 tons, as comapred with 3906 tons, and manufactured steel, 24,828 tons, as compared with 20,164 tons. The exports of machinery show an increase from £1,637,800 to £1,854,420 in value, largely due to the requirements of South Africa.

The Stories of Shipping Combines.

Shipping circles here are kept aroused by the sensational stories, manufactured nobody knows where, but alternately or simultaneously published in London and New York, about more shipping combines and deadly competitions. One set of story tellers seem to think the combines are meant for the destruction of rival ship owners. Another set of story tellers seem to think that these combines are the latest device for robbing the public. It does not seem to strike the sensational newspaper paragraphist that they are purely business arrangements, with the one absorbing object of making money for themselves. Some of us may doubt how the Morgan

combine is going to work out a profit on its excessive capitalization, but that is another story. The syndicate have taken their chances. A weird story has just been wired broadcast from London to the effect that Lord Strathcona and Mount Royal and Sir Christopher Furness are organizing a concern with £10,000,000 of capital, to run 25-knot passenger boats and 16-knot cargo boats between Great Britain and Canada and between British Columbia and Australia, with British and colonial subsidies. It is a pretty story, but those who relate it have no conception of what is implied in the construction of a 25-knot ocean steamer, nor of how much such vessels can be made to pay in the Anglo-Canadian and trans-Pacific trades. How many shipbuilders are there in the world who could turn out a 25-knot boat at any price? As to 16-knot cargo boats, there are more afloat already than can find profitable employment. The trouble in the maritime world just now is not a deficiency, but an oversupply of tonnage—especially in the Atlantic area.

B. T.

Lake Superior Notes.

DULUTH, MINN., July 5, 1902.—Iron ore shipments from the whole Lake Superior region for June were more than 3,500,000 tons, making a total for the year to date of over 8,500,000 to 8,890,000 tons. This is ahead of any preceding season to the corresponding period. The shipments out of Lake Superior, not including Escanaba, were, for June, 2,990,000 gross tons, which is the largest on record, except for the month of July, 1901, when the total was 10,000 tons more. Minnesota mines furnished of the gross amount in June, 2,135,000 tons, and for the season 5,006,000 tons. This latter figure is an increase of 2,260,000 tons over last year. The figures for the season to July 1 and for June, for several past years from Minnesota have been as follows:

Minnesota Ore Shipments.

Year.	Season to July.	Month of June.
1899	2,042,000	1,141,000
1900	3,220,000	1,616,000
1901	2,765,000	1,839,000
1902	5,006,000	2,135,000

An interesting feature of the June shipment this year is the fact that the Duluth, Missabe & Northern road, with docks at Duluth, has led all other roads in the amount of business done, 801,000 gross tons in the 26 days of the month. Its total for the year is nearly double that for the corresponding time last season. The Eastern Minnesota shows the greatest increase, owing to the number of new mines opened along its tracks and operated with traffic contracts to it.

A fifth dock will be added to the loading facilities of the Chicago & Northwestern road at Escanaba. It will be an immense affair, with storage capacity for 50,000 tons, and of modern hight. In addition to the dock proper about 300,000 cubic yards of earth must be dredged in approaches. Contracts for the work have been let to M. J. Peppard & Co.

The Cleveland Cliffs Company.

The Cleveland Cliffs Iron Company have commenced regular train service over their new Marquette & Southeastern road to Munising, a distance of 75 miles from Ishpeming. This road and the Munising road, both of which are owned by the same concern, open a large area of hard wood and hemlock, spruce and cedar lands south and east of the Marquette range. The company plans to utilize these lands for their business and will build a large paper mill at Munising as a part of the general scheme. The large charcoal furnace now going up at Marquette is also a part of the plan, and will utilize some of the vast extent of hard wood forests owned in connection. It is understood that inducements will be held out to makers of furniture and other hard wood articles to locate in the district. The Cleveland Cliffs Company are starting and will work out the development af a large part of the northern peninsula of Michigan, not alone as miners of iron but along all lines that promise reward. Railroads will be constructed, iron will be manufactured, by-products of combustion will be worked up as far as is considered practicable, inducements will be offered settlers and manufacturers to locate and make further improvements; harbors will be improved and the general welfare of that part of the State will be advanced as rapidly and as thoroughly as skill, foresight and means will permit.

The work is in some respects similar to that now being carried forward at and about the Sault by F. H. Clergue and associates. Mr. Clergue, too, will build a large paper mill. He now has in operation very large and successful pulp mills, both for ground wood and sulphite, and a natural development of the Sault scheme is for a paper mill. It is now announced that one of the largest in the country will be erected immediately, to cost about $2,500,000, and to use a part of the pulp ground by the Sault power.

The Zenith Furnace Company of Duluth have bought a small ore property of Messrs. Hill, Bliss and others, adjoining the Williams mine, which they own in connection with the Duluth Furnace. It will secure a part of their ore supply from the new property and will buy the rest from Mesaba range mines, probably Hibbing. The furnace will blow in during August.

Lake Copper Mining.

Accustomed as we are to the enormous tonnages of the iron mines of Lake Superior, the vast amount of rock daily mined and treated by the copper companies of the district passes practically unnoticed in so far as mere weight is concerned. But the daily mining of selected rock in the Lake copper mines is now about 22,000 tons. It is no slight task, for a region where great tasks are the rule, to mine the quantity of rock required to make this selection, to hoist it to the surface through shafts that are in many instances 3000 to 4000 feet and deeper, to crush it to sand and to wash out the most minute particles of metal from the pulverized mass. The daily average production of refined copper from this district is about 300 tons, or about 1 1-3 per cent. One mine is stamping 5000 tons of rock daily and is making about half the copper. This mine, instead of making the average of 26 pounds of refined copper from each ton of rock, is getting more than 60 pounds, this showing the commanding position Calumet & Hecla holds in the Lake copper region. While the iron ore mines of the Lake are mining perhaps 24,000,000 tons this year, the copper mines, it will be seen from the above figures, are hoisting and treating about 6,600,000 tons.

The Lake copper mines, by the way, are not having as rosy a time now as they would like. Two years ago copper was selling at 18 cents a pound, or more. Then the cost of living was less than now, but wages were gradually raised with the advance in copper values. With a third lopped off the price of the finished metal, and with wages at the same high point, there is no margin for many of the large mines. It will be exceedingly difficult to reduce wages, as the cost of the necessities of life, and of what copper mining people have come through long prosperity to regard as the necessities, is higher now than when wages were first put at their present plane, and it will be doubly difficult now to cut them down materially. This is especially true by reason of the greater competition for miners in the adjacent iron ore regions. There are probably not more than half a dozen mines in the Lake copper district that can produce enough selected rock to make enough of an output to pay at present prices. The rest must go along without dividends, certainly, and perhaps only by trenching on their reserve funds until such time as wages can be lowered by a readjustment, or until the price of copper reaches such a point that they can produce at a better margin.

The Crystal Falls Group.

The Crystal Falls group of mines, on the Menominee range, will this year make the largest production in the history of the district. The Crystal Falls mine has now shipped its large stock pile and the same company will send down the stocks at the Armenia and Tobin, containing 40,000 tons. This is more than these two mines have ever produced in a single season. Other old mines are being reopened, and with new shafts and new machinery will produce more than ever, while the total number of producers is greater than before. This district is very active.

What seems to be a valuable find was recently made on the Oliver Iron Mining Company's Tilden mine on the Gogebic range. Superintendent Knight noticed that where a portion of the rock wall on one side of the old cave at the west end of the property had crumbled away the exposed wall had an ore like appearance. On making examination he found that it was ore and set men at work to tunnel. This tunnel has now progressed far enough to show the new find to be of considerable thickness and of good grade. It is hoped that a large addition may thus be made to the tonnage on the property. This is one of the many instances constantly coming out showing the importance of the element of chance in mining operations. D. E. W.

The St. Lawrence power plant at Massena, N. Y., has been sold under foreclosure for $500,000 to Mark T. Cox of Robert Winthrop & Co., who represents the reorganization committee of the first and second mortgage bondholders. More than $10,000,000 has been spent on the property, which failed because there were no plants built to utilize its power. The stock was almost entirely owned in England.

At a recent meeting of the British Gas Institute Walter Hole pointed out the saving which could be realized by using 12-foot lengths of cast iron pipe in the place of the 9-foot lengths which have been the standard in England. American makers of cast iron pipe have argued persistently for the change, with apparently little effect until now.

The shipping of Texas oil to Philadelphia has recently assumed larger proportions than ever before. In addition to the oil cargoes which have been received by the Sun Oil, Union Petroleum and other companies at Marcus Hook the Standard Oil Company have brought a number of bulk cargoes to their works at Point Breeze, where they mix the Texas with their Pennsylvania oil, thus getting both illuminating oil and distillate more cheaply. Two additional cargoes of 8000 or 9000 barrels each are now on their way from Sabine Pass to the Atlantic Refining Company. J. M. Guffey has made considerable progress with his plant at Gibson's Point, on the Schuylkill, opposite the Atlantic Refining Works, nine large tanks having been already erected. The "J. M. Guffey," his bulk oil steamer, recently launched from the New York Shipbuilding Company's yard, has probably left Port Arthur for Philadelphia with her first cargo of about 30,000 barrels.

Armor Plates Pierced.

Complete Perforation of 12-Inch and 6-Inch Cemented Krupp Steel Armor Plates by Means of the Johnson Capped Projectile.

That modern guns and projectiles have defeated armor plate manufactured according to the best mod-

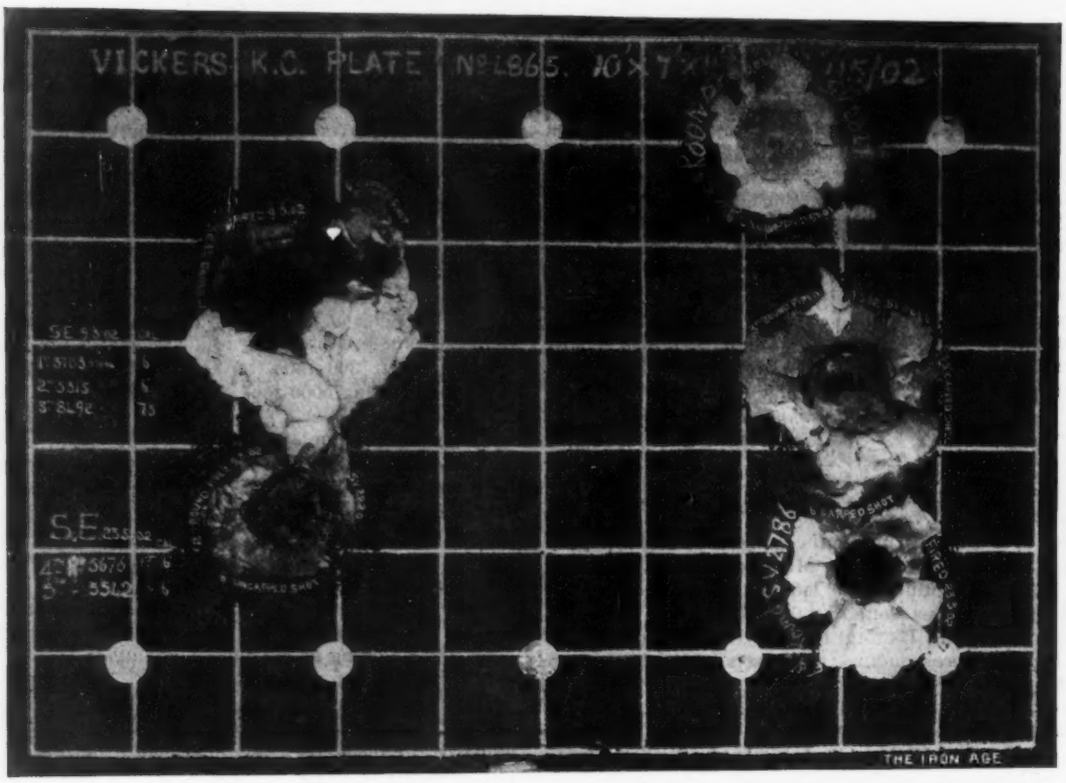


Fig. 1.—Showing Effects on 12-Inch Plate.

ARMOR PLATES PIERCED.

ern practice was proven at an interesting series of tests recently held before members of the British Admiralty at Eskweals, England, under the auspices of Vickers, Sons & Maxim, Limited. The principal tests were made on May 23 last, a preliminary trial having been conducted on May 9. A 6-inch and a 12-inch plate were completely perforated several times by means of 6-inch and 7.5-inch Vickers armor piercing projectiles and shells provided with the Johnson cap. The plates were manufactured according to the latest Krupp process, including cementation and subsequent hardening by chilling the face.

The success of the trials was due to the Johnson cap, which is manufactured by Isaac G. Johnson & Co. of Spuyten Duyvil, New York City. Uncapped shots fired under the same conditions as the capped were shattered into fragments upon striking the plate. Another important feature of the tests was the superior showing made by the use of Nitrocellulose as compared with Cordite.

The Johnson cap has been adopted by all of the

powers excepting England. Previous tests have proved its efficacy in guiding shot and shell through armor plate, supporting and protecting the point of the projectile upon the hardened plate and enabling it to find its way into the armor. But never before the Eskweals tests was a 6-inch capped shot directed against a 12-inch plate. The result of this first test, made on May 9 last, was so satisfactory that it surprised even E. M. Johnson, the inventor, who was present at the time. Consequently a more elaborate series of tests was arranged for May 23, and the entire Admiralty Board, with but one exception, was present to witness the results.

The plates were manufactured according to the British Admiralty specifications and a shot was fired at each plate in full accordance with the Admiralty tests prescribed for the acceptance or rejection of such plates.

On May 9, the date of the preliminary test, three shots were fired at the 12-inch plate. Their effect is indicated on Fig. 1, being the two on the left and the middle crater shown on the right hand side of the plate. As will be noted from official report printed in another column, the first shot completely perforated the plate. The projectile was broken up, the penetration measuring 18 inches to the base of the shot and 23½ inches after removing the fragments. It was a 6-inch capped shot. The second shot fired was uncapped and was completely broken up, the penetration amounting to about 3¾ inches, the point of the shot remaining fused in the plate. The third attack was made by an explosive shell from a 7.5-inch gun and fitted with the Johnson cap. The shell became imbedded in the plate, but was not fused. After the successive shots were made on the same plate the shell became loosened so that a feeler could be inserted outside the shell for a distance of 11¾ inches, showing that the capped shell nearly, if not quite, perforated the plate.

In the tests of May 23 the same 12-inch plate was attacked which has just been referred to. The first shot fired, which was the fourth shot of the entire tests, was a 6-inch 105.5-pound Vickers armor piercing shot fitted with the Johnson cap. It completely perforated the plate, but remained imbedded in the wood backing or skin plate. The fifth shot was a 6-inch standard 100-pound Firth armor piercing projectile without cap and having a striking velocity of 2827 feet. It was completely broken up, the penetration amounting to 3 inches and the point of the shot remaining fused in the plate. A large piece of this shot rebounded and was found 20 feet in front of the plate.

Three shots were directed at a 6-inch plate, Fig. 2, two of which were capped and one uncapped. The first shot was the uncapped and was a plate test. It proved the plate to be fully up to standard, as no cracks resulted and the plate showed no bulge in back. It was a 6-inch Vickers 100-pound armor piercing shot, possessing a striking velocity of 1995 feet. The projectile was entirely broken up, the point remaining fused in the plate. The second shot was a 7.5-inch armor piercing projectile weighing 205 pounds and capped, having a striking velocity of 1971 feet. It completely perforated the plate and was recovered later, having plowed 20 feet into the sand in back of the plate. With the third

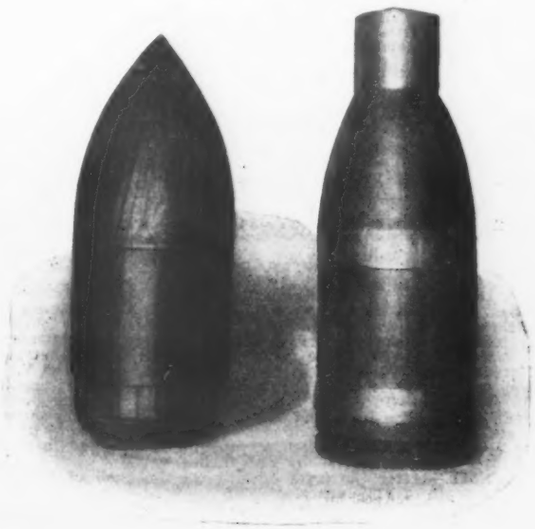


Fig. 3.—Johnson Capped Projectile Before and After Passing through Plate.

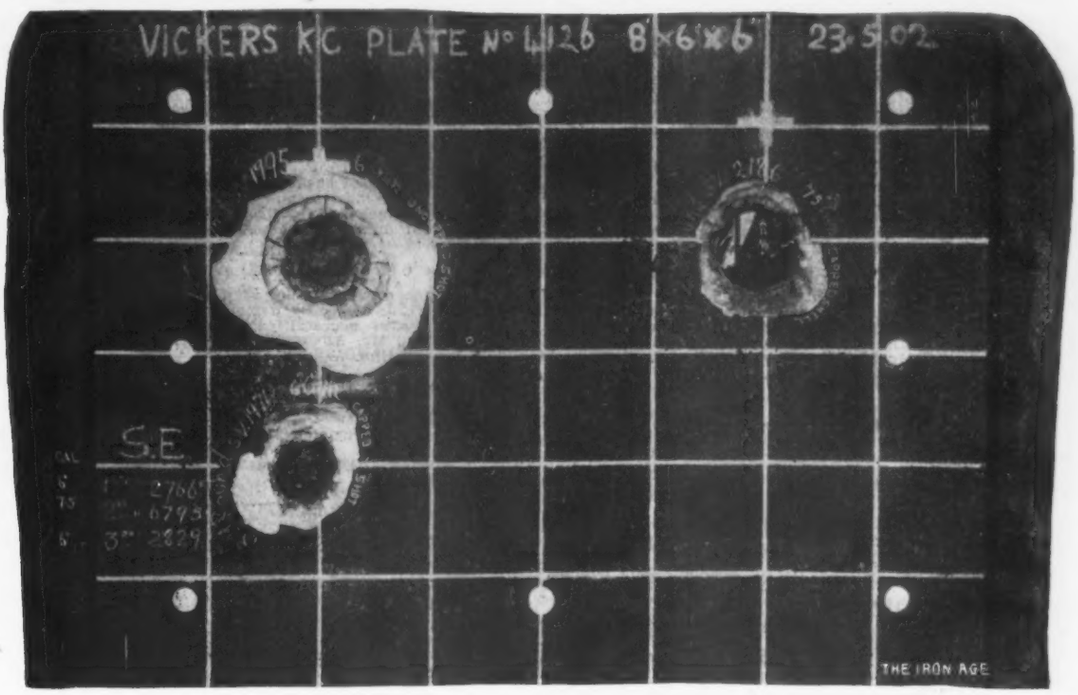


Fig. 2.—Showing Effects on 6-Inch Plate.

ARMOR PLATES PIERCED.

shot, which was a 6-inch capped, the plate was again perforated, the projectile breaking up and pieces being found in the rear. The complete official report follows:

the firm's mortgage bond holders to Mark T. Cox of New York, representing the Reorganization Committee of the first and second mortgage bond holders for $500,000.

TESTS OF 6-INCH AND 7.5-INCH GUNS AGAINST 6-INCH AND 12-INCH CEMENTED (KRUPP) STEEL ARMOR PLATES

Table I.—First, Second and Third Rounds Against 11 13-16-Inch Plate.

Date: May 9, 1902. Firing at Eskmeals range for trial of 7.5 and 6 inch Vickers armor piercing projectile fitted with Johnson cap against a 12-inch Vickers K. C. plate, No. 4865. Ordnance No.: 1037A, 6-inch B.L., Mark B.; and No. 1017A, 7.5 B.L., 50 calibers. Mountings: Naval pedestal. Present: Admiral May, R. N. Commander Hope, R. N.; Major Minchin, R. A.; Major Bittleston, R. A.; Mr. Albert Vickers, Lieutenant Dawson, Mr. Malcolm Hay, Mr. E. M. Johnson, and Major the Hon. A. Lambart.

Temperature of charge..80 degrees F.
Thermometer {Dry bulb..48 " {Wet " ..47 "
Barometer .....30.25 inches.

Round.	Charge. Nature.	Charge. Weight. Pounds.	Projectile and fuse.	Velocity. Mean muzzle. Foot-seconds.	S.V. Foot-seconds.	S.E. Foot-tons.	Ramming. Inches.
1	R. R. 384, Nitro-cellulose.	34	Vickers 6-inch A.P. shot, fitted with Johnson cap, 105 pounds.	2,856	2,799	5,705	41.65
2	Ditto.	34	Vickers 6-inch A.P. shot without cap, 100 pounds.	2,880	2,820	5,513	41.55
3	Cordite 30/30	43	Vickers 7.5-inch A.P. shell, fitted with Johnson cap, 205 pounds.	2,480	2,444	8,492	66.75

ROUND 1.—Completely perforated plate. Projectile was broken up. Penetration measured 18 inches to base of shot, after removing its fragments the penetration measured 23½ inches. Extent of injury by scaling, 18.5 inches H. by 20.5 inches V. No cracks. Diameter of hole, 6 inches. This shot struck exactly in front of a horizontal H. girder, and bulged it back 1⅞ inches, otherwise it would have gone completely through.

ROUND 2.—Projectile completely broken up. Penetration about 3¾ inches, but point of shot remained fused in plate. Extent of injury by scaling, 18½ inches H. by 19 inches V. No cracks. Diameter of portion of shot in hole = 8 inches. There was no trace of bulge at back, or any displacement of backing.

ROUND 3.—Projectile broken up, but all the point portion, including 2 inches of core, remained in plate; it was not, however, fused in as in Round 2, for a feeler could be inserted in many places around the periphery up to 7 inches from face of plate. Penetration to front end of core was 5 inches: if, therefore, the point preserved its profile, the total penetration would be 9½ inches. Base portion set up and part flowed in molten state into the front of core, molding itself to its contour. Extent of injury, 23.5 inches H. by 21.5 inches V.

NOTE.—After the tests of May 23 the shell of Round 3 became loosened in the plate, so that a feeler could be inserted to the depth of 11¾ inches.

Table II.—Fourth and Fifth Rounds Against 11 13-16-inch Plate.

Date: May 23, 1902. Firing at Eskmeals range for trial of Vickers 6-inch armor-piercing shot fitted with Johnson cap against a Vickers 12-inch K. C. plate, No. 4865. Ordnance No.: 1037A, 6-inch, Mark B. Mounting: Naval pedestal. Present: Lord Walter Kerr, Admiral May, Admiral Fawkes, Captain Foote, R.N.; Colonel T. E. Vickers, Mr. Albert Vickers, Mr. Douglas Vickers, Lieutenant Dawson, Mr. Malcolm Hay, the Hon. S. P. Bouverie, and Major the Hon. A. Lambart.

Temperature of charge.....80 degrees F.
Thermometer {Dry bulb .....55 " {Wet " .....54 "
Barometer .....30.3 inches

Round.	Charge. Nature	Charge. Weight. Pounds.	Projectile and Fuse.	Velocity. Mean Muzzle. Foot seconds.	S.V. Foot seconds.	S.E. Foot tons.	Ramming. inches.
4	R.R. 384. Nitro-cellulose.	34	6-inch Vickers A. P. shot fitted with Johnson cap. Weight, 105.5 lbs.	2,841	2,786	5,676	41.75
5	Ditto.	34	6-inch standard A. P. shot without cap. Weight, 100 lbs.	2,887	2.827	5,542	41.7

Three rounds had previously been fired at this plate on May 9, 1902.

ROUND 4.—Shot completely perforated plate, but did not get through the wood backing or skin plate. The shot remained in backing, the rear of base being 9 inches from surface of plate; a feeler could be inserted along the outside of shot to a distance of 16 inches from surface of plate. The extent of injury by scaling was 20 inches H. by 22½ inches V.

ROUND 5.—Shot completely broken up. Penetration 3 inches. Point of shot remained fused in plate. A large piece of shot rebounded and was found 20 feet in front of plate.

Table III.—Trials Against the 6-inch Plate.

Date: May 23, 1902. Firing at Eskmeals range for trial of Vickers 6-inch armor piercing shot and 7.5 inch armor piercing shell, both fitted with Johnson caps, against a Vickers K.C. plate, No. 4126, 8 feet by 6 feet by 6 inches. Ordnance No.: 1037A, 6-inch, Mark B, and No. 1017A, 7.5-inch, 50 calibers. Mounting: Naval pedestal. Present: Lord Walter Kerr, Admiral May, Admiral Fawkes, Captain Foote, R. N.; Colonel T. E. Vickers, Mr. Albert Vickers, Mr. Douglas Vickers, Lieutenant Dawson, Mr. Malcolm Hay, the Hon. S. P. Bouverie, and Major the Hon. A. Lambart.

Temperature of charge.....80 degrees F.
Thermometer {Dry bulb .....55 " {Wet " .....54 "
Barometer .....30.3 inches

Round.	Charge. Nature	Charge. Weight. Pounds.	Projectile and Fuse.	Velocity. Mean Muzzle. Foot seconds.	S.V. Foot seconds.	S.E. Foot tons.	Ramming. inches.
1	Cordite 20/17, Lot 119	12.5	6-inch A.P. shot (Vickers), without cap. Weight, 100 pounds.	2,034	1,995	2,766	41.25
2	Cordite 30/30, Lot 117	35.3125	7.5-inch A.P. shell, fitted with Johnson cap. Weight, 205 pounds.	2,221	2,186	6,795	66.75
3	Cordite 20/17, Lot 119	12.94	6-inch A.P. shot (Vickers), fitted with Johnson cap. Weight, 105 pounds.	2,007	1,971	2,829	41.31

ROUND 1.—Projectile broke up, point remaining fused in plate. Extent of injury by scaling, 24 inches H. by 22 inches V. There were no cracks. There were signs of a bulge at the back.

ROUND 2.—Complete perforation took place; no pieces of shell, except the base plug, were found. The size of hole was 8.75 inches by 8.5 inches., Extent of scaling, 14.5 inches H. by 14.5 inches V. The point of shell of this round, weighing 92 pounds, was subsequently recovered, having penetrated 20 feet into sand at rear of target.

ROUND 3.—Complete perforation took place. Projectile broke up, pieces being found in rear. Size of hole, about 6½ inches. Extent of injury by scaling was 13 inches H. by 14 inches V.

The Johnson cap is of forged steel, cylindical in form, with its bottom cored out to fit over the nose of the projectile. A small groove is cut around the point of the projectile to allow the cap to be fitted on. The cap is forced on with hydraulic pressure. The groove also prevents a rotation of the cap on the projectile. In Fig. 3 the projectile with cap fitted on is shown, as well as the same projectile after having passed through a 10-inch reforged Harveyized nickel steel armor plate.

The St. Lawrence power plant at Massena, N. Y., has been sold under foreclosure proceedings begun by

The St. Lawrence Power Company had spent more than $10,000,000 in the scheme, most of which, it is understood, was furnished by English capitalists. The capacity of the plant was to be from 100,000 to 150,000 horse-power, and the power building is 65 x 526 feet.

J. W. Peterson, who was formerly connected with the Chicago sales department of the Stanley Electric Mfg. Company and the Northern Electrical Mfg. Company, has been elected vice-president and general manager of the Electrical Equipment Company, with offices at suite 939 Monadnock Block, Chicago.

The Iron Age

New York, Thursday, July 10, 1902

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
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The Crop Outlook.

July has given to the crops great growing weather thus far; rain in the parched districts of the cotton belt and high temperature with less moisture in the winter wheat section. Of course the damage done to wheat in harvest, and which caused much alarm and sharp advances in the leading markets last week, cannot be repaired, but the grain which is still standing will receive much benefit. Already reports are being received that the damage sustained by corn and winter wheat has been overestimated, and from Kansas, Nebraska, Indian Territory, Oklahoma, Ohio, Michigan and Missouri especially comes news of an encouraging nature.

This is merely another illustration of the general and natural tendency to exaggerate the relative importance of matters and things close at hand, just as any small object held immediately before the eyes may shut out the sun. After such widespread and excessive rains throughout the month of June—the rainfall amounting to 5.97 inches—we may reasonably anticipate more favorable conditions for the harvesting of wheat and the growing of corn, but it must not be lost sight of that the continuance of June weather conditions means serious damage to winter wheat.

Spring wheat, however, has maintained its favorable condition, notwithstanding there have been some complaints of rust. The heavy rains have been beneficial rather than otherwise; the grain is heading.

Throughout the corn belt, but especially in the lake region and in the upper Mississippi Valley, low temperature checked the growth, and heavy rains prevented cultivation over wide areas for a week or more, but the hot weather of the past few days has stimulated growth wonderfully, and, with drying winds, has put the fields in better condition for cultivation. In the Southern portion of the belt corn is reported in prime condition.

The oat crop has sustained some damage, with winter wheat, from rain; some lodging has been reported, but the stand is generally heavy. A large crop is reported being harvested in Oklahoma and Kansas, and the outlook is favorable for a liberal yield in Nebraska. Although some permanent damage has been done, the continuation of the present seasonable weather means the reaping of more than an average crop.

The relief afforded to cotton in the major portion of the drought-visited sections of Texas and the favorable conditions existing in the northern part of the central and eastern sections of the cotton belt have been especially encouraging, modified by dry weather in Georgia and damage by insects in the central and western gulf States.

Some damage has been done to hay in the harvest field, but a large crop is in sight in the heavy yielding States. An immense crop of potatoes is promised.

The live stock in the country is said to be much reduced, as compared with the herds and droves preparing for market a year ago. Last summer cattle and hogs were plentiful and the outlook for feed was unfavorable; now large crops of feedstuffs are promised, and while live stock, as a general fact, is scarce, it is notable that special conditions are forcing the marketing of full stocks of large herds of cattle from Texas, which may compensate to a large extent for the depleted stocks in Illinois, Iowa, Missouri and other Eastern pastures.

Foreign advices indicate that a full average world crop of wheat may be anticipated, there having been a material improvement in the prospects of the European crops during the past two weeks, although the promise of a month or so ago has not been sustained.

Changes in the Supply of Money.

The per capita circulation is 40 cents more than it was a year ago. There was no reason to suppose that it was deficient then, so that there is no occasion to regard the present supply as inadequate, but it remains true that the means of increasing the supply to meet the demands of rapidly increasing business are not entirely satisfactory. The amount of business a nation does is not rigidly limited by the amount of its circulating medium, but larger business calls for larger supplies of money, and a good deal depends on the times when the currency is increased or decreased, and there is a very decided choice in the means by which the changes of volume are effected.

In round figures the amount of money in the country, including gold bullion in the Treasury, increased in the year $75,000,000. Much the greater part of this, almost $64,000,000, was in gold, and this was wholly due to the domestic production of the metal. The production last year is estimated to have been just over $80,000,000. A good deal, more than three-fourths of this, then, went to the mints and to the Treasury vaults. In spite of our very large excess of merchandise exports the gold movement inward and outward almost precisely balanced; only the production of our own mines has provided for this increase in the supply of gold, which makes about five-sixths of the whole increase in the circulating medium.

Of two sorts of legal tender paper, the United States notes, commonly called "greenbacks," are absolutely fixed in amount. The Treasury notes, or "Sherman notes," are undergoing a process of extermination by redemption, and during the past year the amount of them was reduced nearly $18,000,000. Small quantities of silver dollars are still coined, but they have always been regarded as inconvenient. In the early part of the last century half dollars and paper money were used in preference. Since the manufacture of them was resumed in 1878 nearly all of them have been represented in circulation by the certificates. During the past year nearly 20,000,000 of the silver dollars were struck, but only a little more than one in ten went into circulation; the silver certificates in circulation increased over $17,000,000.

The peculiar feature of the currency changes is that the national bank circulation has increased less than $3,000,000 in the past 12 months. The process of reduction is already in operation, because the amount of bank currency secured by bonds has decreased $9,000,000, and the amount secured by a deposit of money, and therefore in process of retirement, is $12,000,000 greater than it was a year ago. Last fall and early in the winter there was a considerable movement of the banks to retire their circulation and sell their bonds at the high prices then prevailing. The reduction since the beginning of the year has been about $8,000,000. The present is a season when the need of money is less than in the crop

moving season, but last fall the volume of bank currency was reduced at the busiest time of the year, and the conditions which have tended to this curtailment of the bank circulation afford little ground to hope for much expansion next fall.

The act increasing the circulation of national banks by creating small banks, and by allowing banks to issue notes to the par value of the security instead of 90 per cent. of it, has spent its force. It secured a considerable increase in the circulation, but the small banks have taken out much less circulation than they were expected to, and banks that raised their circulation from 90 to 100 per cent. of their bonds, and in some cases increased the amount of bonds they deposited, have reached the limits of profit in circulation, and on account of the high price of bonds have been reducing their circulation. Nearly 20 years ago the bank circulation began to decline and this continued for ten years. After that there was a slow increase, much stimulated two years ago by legislation. But the bank currency cannot rise and fall from season to season with the condition of trade, or steadily expand from year to year with the growth of business, so long as its issue is conditioned upon the deposit of Government bonds.

The Copper Situation.

Optimists have been having their innings for some time past in the copper trade, since those producing interests which are still doubtful as to the future are rarely quoted. Yet there is a good deal to be said on both sides. It is quite generally admitted now that fully 125,000,000 pounds of copper were accumulated in this country during the period of high prices, which culminated in the crash of December last. It is quite certain that a good deal of this surplus and possibly all of it was marketed at home and abroad, but it is not quite clear, by any means, whether it actually went into consumption at once, or how much of it was transferred from the producers' warehouses to the mills and shops of consumers to restore the reserve supply of raw material which every prudent manufacturer carries in normal times.

It is difficult to believe that legitimate consumption has taken care, during the last six months, not only of the surplus stock of 125,000,000 pounds of copper, but also of the current production during the interval, which has been going on at the old rate. With business still lagging in Europe, the burden of absorbing so large a mass of the red metal, nearly six months' consumption in normal times, is supposed to have been carried by the American consumer. Unless convincing evidence of that fact is produced the trade will maintain a doubting attitude.

The future does not hold out much hope of immediate relief from the producing standpoint. The low prices do not seem to have checked the operations of the copper mines. On the contrary, it is probable that we shall witness a steady increase in the output. It is true that in 1901 the United States made less copper than it did during the year 1900, but this has been more than overbalanced by the operations in our neighboring countries, Mexico and British Columbia, whose copper product largely passes into the United States.

In British Columbia the production rose from 10,000,000 pounds in 1900 to 30,700,000 pounds in 1901. While we do not exactly know the growth of Mexico, we do know that a number of producers have been and are falling into line, among them the famous Greene Consolidated of Cananea, with an output of at least 4,000,000 pounds fine per month, and the Nacosari, which belongs to the Phelps Dodge interest, and is not now running full on account of inadequate power.

The decline in the copper production of the United States from 1900 to 1901 was due principally to the falling off in Montana, which was partly offset by the increase in Arizona, Utah, California and other States. A return in the current year to the production of 1900 on the part of Montana would represent an increase of about 40,000,000 pounds. But there is every prospect of steady additions to output in many districts. The projects which were developed during the period of high prices are only now bearing fruit.

On Lake Superior a number of mines are getting their new equipment into shape, prominent among them being the South Range group, the Trimountain, Baltic and Champion. Besides, the Mass, Isle Royale and Mohawk are to have new mills, and the Calumet & Hecla are to operate a large new plant on lower grade rock.

In Arizona the Shannon, in the Clifton district, first started in 1901, will increase to a product close to 800,000 pounds a month. The Arizona Copper Company are now running at a heavier rate. The Calumet and Arizona, in which steel manufacturers are largely interested, will come in this fall with at the rate of 600,000 pounds a month. The United Verde will make more copper and one or two small propositions may add their quota.

In California, Bully Hill, which got fairly started in 1901, will tell this year, and the Trinity plant, also in Shasta County, may get into operation. In Utah the Bingham is now in full swing and the United States Mining Company's plant is expected to start. Idaho may witness active production on the part of the Seven Devils and White Knob companies. The Grand Encampment smelter in Wyoming will encourage a fuller production in that district. Finally, in the South we have the Tennessee Copper Company running now at the rate of close to 10,000,000 pounds per annum.

Individually none of these undertakings are large, but in the aggregate they are bound to tell quite seriously in the direction of enlarging the copper product. As yet we have not heard of a single one of the older active mines which has been forced to stop or to curtail because of low prices, and it seems doubtful whether the great companies will be willing "to hold the umbrella" over the host of smaller producers, old and new, by cutting down output by agreement.

There are very few of them who cannot live at the present range of prices, particularly when they stop expensive development work and improvements. On the other hand it is true that there is little immediate prospect of a lowering in costs. Labor is too well employed throughout the country to submit to reductions in wages, and besides fuel and supplies are high, for causes upon which the situation in the copper industry has very little influence.

It looks, therefore, as though it will need our full consumption in this country and a steady improvement of that in other countries to keep values at the present level.

The railway, mill and factory supply business of Walter A. Zelnicker, 408 North Fourth street, St. Louis, Mo., with rail yards and factory at East St. Louis, Ill., has been absorbed by the Walter A. Zelnicker Supply Company. Asociated with Mr. Zelnicker in the new company is William D. Biggers, formerly manager city wholesale department of the Simmons Hardware Company, who will take charge of the general supply business of the company, while Mr. Zelnicker will de-

vote his attention to rails and equipment. Edward Elson, vice-president, will continue as manager of the New Orleans branch with offices at 206 Godchaux Building, and Louis Alsberg, formerly cashier, will be treasurer. The new company will greatly extend the business and have in course of preparation a catalogue, showing a complete line of supplies.

The Utilization of Peat by Electricity.

Although electricity is not generally regarded by engineers as an economical heating agent, its use for this purpose in many industrial operations is increasing. This advance is due to the fact that by aid of electricity the heat can be generated exactly at the spot where it is to become effective, and that the losses arising from radiation and conduction are therefore reduced to a minimum. Even where only moderate temperatures are required there is much to be said in favor of using electricity, and when the the generating costs are exceptionally low, the actual cost of the heating operation compares favorably with the cost of heating by coal.

The latest example of this use of the electric current is in the manufacture of peat fuel. Nearly every country of Europe possesses immense peat bogs and morasses, which are as yet practically unutilized for industrial purposes. Peat moss litter, and peat fuel, have so far been the chief manufactured products. Natural peat fuel has only been used, in fact, in special cases where no other fuel was available. The difficulty in obtaining a satisfactory fuel substitute from ordinary peat is due to the immense amount of water which it contains in its natural state. The percentage of water runs up to 80 and even 85 per cent., and, of course, has to be removed before the remaining 15 per cent. of solid carbonaceous matter can be rendered available for fuel purposes. Many methods have been devised for removing portions or the whole of this water, and for the manufacture of a satisfactory peat fuel. Some of these processes have been industrially operated, and have yielded fairly satisfactory results.

The process which is about to be described differs from all earlier ones in the use of the electric current for carbonizing the dried peat in retorts of special design. It is the invention of P. Jebsen of Dale, Norway, and the process is patented in Norway and in other countries. The process has been in actual operation at Stangfiorden, Norway, since 1898, with favorable results. The plant at present installed deals with 1000 centners air-dried peat per day. The process yields a dense and compact mass after the heating in the retorts. The specific gravity of the carbonized fuel in the broken condition is about 0.30, and the theoretical calorific value about 7250 thermal units. The fuel burns well and yields little soot or ash. An analysis of the products, made by the authorities at the Konigl, Norweg. Hochschule in Christiania gave the following mean composition: Carbon, 76.91 per cent.; hydrogen, 4.64 per cent.; oxygen, 8.15 per cent.; nitrogen, 1.78 per cent.; sulphur, 0.70 per cent.; ash, 3.00 per cent.; moisture, 4.82 per cent.

The power required for carrying out the Jebsen treatment at Stangfiorden is derived from five 80-kw. dynamos direct coupled to five turbines of 128 horsepower each. The power generating installation was provided by Schuckert et Cie. of Nuremburg. The wet peat is brought to the factory direct from the bog by water, in lighters of about 100 tons capacity. The boats are discharged by aid of mechanical power, and the peat is submitted to the first drying and pressing operation. This is carried out in a 5 horse-power press, which can turn out 2500 pressed blocks of peat, each measuring 31.5 x 3 x 3 inches per hour. The average weight of dried peat in each of these blocks is 2.2 pounds.

The briquettes of pressed and partially dried peat are next loaded into trolley shelf wagons specially designed for tunnel drying by an American company. Each wagon carries, when fully loaded, 140 of the wet briquettes arranged on ten shelves. The trolley wagons are pushed, when loaded, into the cooler end of the drying tunnel. The air draft which passes through the tunnel is set in motion by fans electrically operated, and is heated by the waste gases from the retorts. The air has a temperature of 90 to 100 degrees C. at the top end of the tunnel where the wagons emerge, and one of 40 to 50 degrees C. at the lower end where they enter. As the wagons pass up the tunnel, the peat is, therefore, submitted to a gradually increasing temperature. The drying plant at Stangfiorden comprises one hot air stove, three electric fans, two tunnels and 102 shelf wagons; 1000 centners of air dried peat blocks can be produced per day. The wagons with their charges of dried peat are next taken on tram rails direct into the retort house, and are emptied directly into the retorts.

The retorts are upright cylindrical vessels of iron, about 6.56 feet in hight and 3.28 feet in diameter. Each retort has a removable cover, and a discharging hole below, and is in addition provided with gas exit pipes and a pressure gauge. The retorts are provided with spiral resistance coils of special construction, and the blocks of peat are built up in actual contact with these, until the retort is entirely filled with a pigeon-holed mass of peat, in the center of which the heating agent lies. The top cover of the retort is now clamped down, and the electric current connections are made. Losses by radiation are minimized by lining the retorts with asbestos. The peat yields three products when submitted to this electrical heating in closed retorts. The gaseous products pass away by openings in the retort cover, and after scrubbing are employed for heating the air used in the drying tunnels. The tarry liquid condensed in the gas pipes and in the scrubbers contains tar oils, ammonia and other compounds, and if the plant and technical skill are available, may be worked up for these products on the spot.

The peat fuel remaining in the retort after the carbonizing operation is completed is allowed to cool down to 130 degrees C. before opening the retort, and is then discharged direct into wagons running beneath the retorts. The peat fuel produced at the Stangfiorden factory is shipped direct to Bergen, where it is said to meet with a ready sale. The average yield of the air dried peat at Stangfiorden is as follows: Peat fuel, 33 per cent.; peat tar, 4 per cent.; tar water, 40 per cent., and gaseous products, 23 per cent.

Maintenance of Steel Cars.

At the Saratoga convention of the Master Car Builders' Association, the question of maintenance of steel cars was discussed. W. H. Lewis considered that the problem of maintaining steel cars was not essentially different from that of maintaining locomotives. Steel cars had not been in use long enough for the railways to have had any experience in their maintenance due to age and natural depreciation. So far all repairs had been those made necessary by wrecks. Prior to 1898 there were no steel cars to speak of. In 1897 the Schoen Pressed Steel Company turned out 501 cars, and the total number of cars manufactured by that firm and their successor, the Pressed Steel Car Company, up to June 1, 1902, was 63,872. Counting in the steel cars made by others, there were now in service perhaps 70,000 of such cars. This was less than one-half of 1 per cent. of the total number of cars in service in the United States. There was, therefore, not enough of such equipment, and it had not been in use long enough to permit railway companies to formulate rules and to provide facilities for its systematic repair and maintenance. They were repairing steel cars with practically the same workmen and tools and plant that they used for repairing wooden cars. He knew of no special tools or facilities actually in use for maintaining steel cars. As their number increased, however, special tools and plant would have to be provided, and now was the time to have the matter in mind.

According to the official report of J. Obalski, inspector of mines of Quebec, the shipments of asbestos during 1901 from the Thelford Black Lake and Danville districts amounted to 2083 short tons of first-class crude valued at $348,379, 2660 tons of second-class crude valued at $263,855, 14,659 tons of fibre worth $450,193, 14,054 tons of paper stock valued at $211,688 and 6831 tons of asbestic worth $10,114, a total of $1,284,429.

Pacific Coast News.

SAN FRANCISCO, CAL., June 28, 1902.—As the holidays approach business insensibly takes on a quiet aspect, and it is no way different this year. This part of the year is always quiet, yet clearing house exchanges for the week ending Saturday exceeded by one-third those for the corresponding time last year. Business in every line connected with the steel, iron and hardware trade has been active; there have been no idle men and no workshops running short time. The only complaint has been that of lack of material; for instance, builders have complained of delay in the delivery of structural steel and some of a scarcity of building hardware. Some of the former now needed cannot be delivered till the fall, and in a couple of instances contracts are at a standstill. The big Flood Building on the site of the old Baldwin Hotel has only now got started after a good deal of delay.

Prices are not particularly complained of. Promptitude in delivery is what is wanted. As it is in San Francisco so it is in the rest of the country, and while this is the case and while our iron works are generally prosperous the iron foundry at Eureka, Humboldt County, not long since in the person of its proprietor sought fresh fields and pastures new. Humboldt County is to-day one of the most prosperous in the whole State, but most of its iron work, machinery, &c., is imported from the East, and there is a good deal of that now being done, as the lumber mills—many of them—are adding to their capacity largely and the output of manufactured redwood in that county will be greater this year than ever before in its history. However, it does not import everything, as a battery of 12 boilers of 1200 horse-power for a leading mill has been made in Eureka.

The Standard Oil Company's pipe line of over 300 miles from Kern River to San Francisco Bay is being laid at the rate of a mile a day with pipe imported from the East. The rate at which the work is done will soon, however, be doubled, and 2 miles a day of pipe will be laid. The associated oil companies are, it is said, soon to follow with a similar pipe line, and Shasta County, the great copper county of the State, is prospering like unto Humboldt and Mendocino, from lumber, and is a good field for the iron and steel trade. A railroad of 114 miles in length from Kern River to Port Harford for the accommodation of the oil producers is talked of and will probably go through. It will take a great deal of steel rails and other railroad iron. Many of the new purchases of redwood and sugar pine lands will result in the erection of mills and the construction of short lines of railroad, which will also call for similar supplies.

The harvest is progressing well all over the northern portion of the State and about one-half the San Joaquin and the southern coast counties, and large crops of wheat, barley and hay will be the result. There will be also large fruit crops. The hopper scare is confined to a few localities and is not now much heard of. Business with the agriculturist and horticultural sections will begin to be very active in a few weeks, when the crops are gathered in.

There is a good export demand, especially for machinery, pipe, sheet iron, typewriters and bicycles, and the late steamers and sailing vessels have taken out large quantities. The "Gaelic," which cleared during the week, had among other consignments $17,000 worth of plows for Vladivostok, the largest shipment on a single steamer that I remember. And, of course, this is only a beginning. She had also a similar consignment valued at $1148 for Formosa, the Chinese island conquered by the Japanese, the first that I have ever heard of, certainly the first from this side. A curious shipment by the same steamer was $1500 of slot machines for China. She had bicycles valued at $8064, all but $30 (for China) consigned to Japan. The "Aloha," June 21, had pipe valued at $31,013 for the Hawaiian Islands; the "Geo. Curtis," June 19, took out sheet iron valued at $5115 for the same destination, and the "St. Paul," which cleared for Unalaska, in Alaska, a couple of weeks since with a cargo valued at $186,000, had a very large proportion of it iron, hardware, &c. J. O. L.

The Worcester Machinists' Strike.

WORCESTER, MASS., July 7, 1902.—The machinists' strike is rapidly approaching complete dissolution. This morning 27 of the strikers went back to their jobs at the shops of the Prentice Bros. Company. Since last week's Worcester letter to *The Iron Age* a number of other strikers from the Prentice shops have given in, making a total of more than 60 men from this shop alone who have abandoned all hope that their demands will ever be granted by their employers and have gone to work again. More of the strikers of the F. E. Reed Company's shops have returned to work, although their number is not so great as at the Prentice shops. As for the other Worcester concerns who have been under the ban of the union's displeasure to the extent of the ordering out of men, enough of the strikers have gone back to make, with outsiders who have been employed, the normal working force for this time of year. F. E. Reed and Prentice Bros. have also taken on considerable numbers of machinists from outside the city. The strikers are fully aware that their cause is hopeless, and there has been much quarrelling at the recent meetings of the union, a considerable faction of those men who are still on strike favoring the declaring off of the strike. The promise is that to-morrow morning will see the shops receiving back more men from the ranks of the strikers.

The strike has been a complete victory for the employers. The Machinists' Union made the demand for a nine-hour day, an advance of 12 per cent. over the existing scale of wages, the advance being on the basis of ten hours' pay for nine hours' work, making it really an advance of 20 per cent. which was demanded. The third demand was that the employers recognize the union. The employers refused flatly to accede to any one of these demands. The union has not been recognized even to receiving an individual striker as a member of the organization. More than 40 employers of machinists banded themselves together as the Worcester Metal Trade Association and agreed to stand by one another. This has been consistently carried out all the way through. In fact all strikes with the exception of those at the Prentice, Reed and H. C. Fish Machine Works' shops resulted from members of the association taking work from the Prentice shop to help out that concern in filling a few time orders.

The union men acknowledge themselves beaten. They say they made their attempt too early, before their organization had become general in its membership. Of the 6000 machinists estimated to be employed in Worcester, and some authorities think the estimate considerably too small, not more than 700 are members of the union. Probably the number is nearer 500. At the most important meetings the attendance has not exceeded 225. So the union men regret acting when they did, and in the same breath acknowledge that it will be a long time, probably four or five years, before they will be in a position to make another attempt to force employers to come to their terms. Machinists outside of the union look upon the disastrous ending of the strike to mean death to the union in Worcester, because hereafter it will be difficult to persuade first-class machinists to become members. The machinists' Union is a new institution in Worcester, this being the first instance in the history of the machine tool business of Worcester where machinists have gone on strike, excepting in isolated cases where as employes of other branches of business, shoe shops, for example, they have sided with members of unions of other trades. There is a good deal of recrimination between the union men, the Reed men being pitted against the Prentice men in the debates over the advisability of declaring the strike off.

Worcester has lost some machinists by the strike, but it is believed that many of them will have the experience of the nine who went into the shops of R. Hoe & Co. of New York. Of the nine seven are back in Worcester, most of them in their old places. After their life in Worcester machine shops they did not like the

conditions which they found in New York and they came back. Other instances of a similar nature are told. On the other hand the men who have come to Worcester from other cities and secured permanent jobs express contentment with conditions here. As a matter of fact few first-class men went away from the city, and not all of those who came here in answer to the advertisements of the machine tool builders proved to be A1 machinists. The more recent applicants for Worcester jobs are of a better class than those which arrived earlier in the strike. The employers are really not worrying over the outlook, for they see where they are to get new men to take the places of strikers who are still out, even if the latter should never give in.

The injunction issued by the Superior Court last week restraining strikers from interfering with those at work or seeking work in the shops, has brought the picketing to a close, excepting in isolated and harmless instances. The union has retained counsel to represent them at the hearing on the bill in equity which brought about temporary injunction, but the hearing will be rather a formality than otherwise, according to present indications, because the pickets and the injunction itself will have ceased to have a purpose, owing to the collapse of the strike. J. N.

Trade Publications.

Pipe Threading Machines.—The last catalogue by D. Saunders' Sons, Yonkers, N. Y., deals very thoroughly with their wide line of pipe threading machines, special machines for pipe mills, tapping and drilling machines, hand stocks and dies for pipe, &c. In their No. 4 C improved pipe threading, cutting and nipple machine, the arrangement of the chuck is such that the pipe is gripped or loosened by the simple movement of the lever, without the necessity of stopping the rotating motion of the gripping chuck, as is the case when the ordinary pipe machine gripping chucks are used—namely, the universal or independent. The movement of the gripping jaws is applied through a system of sliding blocks and levers, which gives the required motion to the chuck jaws to grip any size pipe within the range, 1 to 4 inches, and provides sufficient leverage to grip it firmly by an easy motion of the lever. The operation of adjusting the jaws to grip the different sizes of pipe is very quickly made. After the pipe has been threaded and has to be moved to adjust it for cutting off, or for any other reason, the die head is pushed to one side, allowing the pipe ample room to pass through the cutting head without passing through the die head to the injury of the chasers by the pipe sliding over them.

Lathes.—We have received a catalogue from the Rahn, Mayer, Carpenter Company of Cincinnati, describing their new engine, turret, gap and pan lathes, from 16 to 32 inch swing. These lathes are made with special conveniences for quick and easy handling. The spindles are made from high grade special steel and are ground perfectly true. The boxes are of the best gun metal and are provided with means for taking up wear. The driving cones are of extra large diameter with provision for wide belts. The carriages have long bearings on the ways, with improved devices to prevent their cutting, and can easily be locked for cross feed work. All feeds are adjusted in the apron by a lever convenient to the hand of the operator. This feature does away with the complicated gearing usually found in the headstocks of other lathes, and obviates the necessity of the operator leaving his position in front of his work. The rack, rack gear and all small feed gears are cut from solid steel. All of these lathes are fitted with power cross feeds. The range of both lateral and cross feeds is very large, being adapted for very fine feeds on steel to very heavy feeds for roughing off work. When desired these lathes are furnished with taper attachment, compound rest, rise and fall rest, turret on carriage and automatic turret on the bed with or without power feed (forward only).

Universal Milling Machines.—The Nos. 1½, 2 and 3 universal milling machines now being placed on the market by the Brown & Sharpe Mfg. Company of Providence, are new in design and embody many new features that make them more accurate, trustworthy and efficient than earlier machines of like capacity. Careful attention has been given to the arrangement of the various parts to insure ease of manipulation, compactness and simplicity. The wearing surfaces and spindle bearings are amply proportioned to insure rigidity and to withstand the most severe service. The flat bearings are scraped to surface plates, not for a finished surface, but as a mechanical necessity to insure correct alignments. The cylindrical bearings are ground and fitted to standards; the feed and elevating screws are accurately cut, and the alignments are correct. A special feature is the new feeding mechanism—all spur gears driven by chain—that eliminates the overhanging brackets and other appurtenances necessary to a belt driven feed, and insures a positive and uniform drive. Other important features that have been applied to these machines are: The solid steel overhanging arm, clamped by one lever at the front of the machine; a new feed tripping mechanism of the double plunger type; greatly increased range in swing of table; the telescopic knee screw that does not pass below the base of the machine. One of the most essential characteristics of this machine is the new method of indexing, by which all divisions from 1 to 360 can be obtained.

Engines and Boilers.—The 1902 catalogue of the Larzelere Machine Company of Williamsport, Pa., deals with their engines and boilers of different types. Their Class A engine is designed for heavy and continuous duty, where high speed is desired. The main bearings are of improved construction. The caps bolt up against the bed on planed surfaces with set bolts for adjustment. The bearings are bored out and fitted with babbitt liners of the best grade. The guides are bored out and have ample wearing surfaces. The valves are driven by a compound rocker arm, giving quick openings. The valves have constant travel and "wipe over," so that no shoulder will be worn, and are self adjusting. They will remain tight indefinitely. The governor is of the centrifugal-inertia type, made heavy, with large bearings, and is most liable to derangement.

"Cranes" is the title of a catalogue by the Northern Engineering Works of Detroit, Mich. Their standard electric, overhead traveling cranes have an independent reversible electric motor for each movement. Each motor is applied in the simplest and most direct manner, dispensing with clutches and intricate mechanism. The operations are usually controlled from a cab, but in some special instances the crane can be controlled from the floor. The standard capacities range from 100 tons down to 1 ton, and spans and lifts are made to suit locations. The speeds vary with the capacity of the crane and are kept as high as is consistent with the conditions.

Engines and Boilers.—James Beggs & Co., 9 Dey street, New York, have issued what they call "a gentle reminder," not a catalogue, of their engines and boilers of different designs. Their four-valve automatic cut off engine is built in sizes from 100 to 350 horse-power. It is intended especially for factory and electric light work.

A disastrous fire destroyed the foundries and pattern storage houses of the Union Steam Specialty Company, Scranton, Pa., July 2, causing a loss of about $30,000. This plant was one of the most modern in the country, and had every facility for the casting of pumps, separators and other steam specialties. The company state that they secured quarters for their pattern makers with the Green Ridge Lumber Company on the following day, and are duplicating their patterns without delay, and have also erected a temporary foundry building, 75 x 125 feet, which will be replaced about August 15 with a brick structure nearly twice the size of the old building. The machine shops and offices of the company were not damaged, and all tracings and records were preserved. Owing to the fact that the company had over 150 Duplex pumps and about 40 tons of separators in stock, they do not anticipate any delay in filling orders, as they hope to replace all patterns before their stock is exhausted.

MANUFACTURING.

Iron and Steel.

The following named concerns have signed the Amalgamated Association scale: Youngstown Works of the National Tube Company, Pittsburgh, Pa.; Lockhart Iron & Steel Company, McKee's Rocks, Pa.; Youngstown Iron, Sheet & Tube Company; Anchor Iron & Steel Company; Neal Bros., Pittsburgh, Pa.; Ohio Rolling Mill Company, Findlay, Ohio; Bessemer Rolling Mill of the Tennessee Coal & Iron Company, Bessemer, Ala.; American Rolling Mill Company, Muskegon, Mich.; Niles Sheet Mill Company, James A. Patterson, president, Niles, Ohio; the N. G. Taylor Cumberland Black Plate Mill, Cumberland, Md.; Westerman Rolling Mill Company, Lockport, N. Y.; Zanesville Iron Company, Zanesville, Ohio; Lake Erie Iron & Steel Company, Cleveland, Ohio; Phillips, Nimick & Co., Pittsburgh, Pa.; Railway Spring Steel Company, Detroit, Mich.; Empire Rolling Mill Company, Cleveland, Ohio; the Cleveland Hardware Company, Cleveland, Ohio.

The fifteenth annual meeting of the Antrim Iron Company, Grand Rapids, Mich., was held June 25. An annual dividend of 15 per cent. was declared. The company are capitalized at $350,000. The following Board of Directors were re-elected: T. J. O'Brien, James M. Barnett, H. J. Hollister, J. C. Holt, Willard Barnhart, Edward Lowe and William Judson. The officers are: President, T. J. O'Brien; vice-president, J. M. Barnett; secretary and treasurer, J. C. Holt.

The Cohoes Rolling Mill Company, Cohoes, N. Y., manufacturers of bar and skelp iron, have recently installed a pipe mill for the manufacture of wrought iron pipe.

Chattanooga interests represented by L. S. Colyar and the Ross-Meehan Foundry Company have purchased the Jefferson Iron Company's charcoal furnace at Jefferson, Texas. With the furnace properties proper are included some 5000 acres of mineral lands.

The Glascow Iron Company of Philadelphia are perfecting plans for the erection of two 50-ton open hearth furnaces at their plant at Pottstown, Pa.

At the annual meeting of the stockholders of the Stewart Wire Company, Easton, Pa., held recently, the following were elected directors: William J. Daub, Chester B. Fulmer, J. M. Hackett, C. B. Green, E. I. Hunt, Henry McKeen, John S. Osterstock, Chester Snyder and Charles Stewart.

The Rockdale Iron Company, at Rockdale, Tenn., blew in their furnace on June 15.

The plant of the Wheatland Iron Company, at Wheatland, Pa., is in full operation with orders ahead for the next six months. Some extensive improvements have been made at this works and a new coal haulage system is being installed. The output is plates and iron skelp.

The Sharon Tin Plate Company of Sharon, Pa., have signed the tin plate scale of the Amalgamated Association and their plant is in full operation.

E. E. Erikson, consulting engineer of Pittsburgh, has received a contract for the erection of a scrap heating furnace for the Burden Iron Company of Troy, N. Y. Mr. Erikson has also received a contract for the building of a 15-ton open hearth furnace for the John Rice Foundry & Machine Company of Stevens Point, Wis. Mr. Erikson is also building two 25-ton open hearth furnaces for the West Carnegie Sheet Steel Company, at West Carnegie, near Pittsburgh.

General Machinery.

The Battle Creek Iron Works Company, Limited, of Battle Creek, Mich., have completed their new shops and will be ready for operations September 1. The company will manufacture the Burns automatic drilling and milling machine and other specialties.

The value of the contract secured by the British Westinghouse Electric & Building Company, Limited, for the equipment of the power house to be built for the Metropolitan District Railway at Chelsea, located in the southwest district of London, is about $5,000,000. The major part of the electrical machinery will be turned out at the Westinghouse Works, East Pittsburgh. James Stewart & Co. of Pittsburgh and St. Louis, which concern built the British Westinghouse Works near Trafford Park, Manchester, and are at present erecting the Mersey Tunnel power station, have been allotted the contract for the construction of the Chelsea power station. The value of this contract is about $1,500,000. It is not expected, however, that the material will be purchased in this market, owing to the question of delivery. The structural material used in the construction of the British Westinghouse plant was supplied by an English concern, Dorman, Long & Co. Nearly 140,000 tons of iron and steel were used.

The R. Herschel Mfg. Company of Peoria, Ill., manufacturers of agricultural supplies, advise us that they do not intend to purchase at the present time much of the machinery required for their proposed new plant, but in the course of the next year they will need quite a large amount. They are, however, now in the market for boilers, heaters, shafting and pulleys, clutches, &c. The engine, a Hamilton of 250 horse-power, has been secured. Plans being prepared by Architect Albert Kiefer will call for a plant the construction and equipment of which will cost more than $100,000. There will be a five-story warehouse, 50 x 200 feet; a steel warehouse, 50 x 100 feet; tempering room, 50 feet square; grinding shop, 50 x 125 feet; two-story machine shop, 50 x 125 feet; engine and boiler room, and a small gas plant. It is expected that the shops will be ready for occupancy by the first of next year.

The Riverside Power Company, Riverside, Cal., are having plans prepared for a power plant to cost about $200,000. W. E. Podley, manager of the San Jacinto Land Company, has the contract for the canal, to be six miles long, about one mile of which is completed.

C. B. Hammet, Tuscola, Ill., founder and machinist, intends to erect a new foundry and machine shop, the location of which has not yet been decided upon.

The Wiscoy Falls, in the town of Fillmore, Allegany County, N. Y., are to be harnessed, and the power applied to the operation of a $25,000 plant for the manufacture of drugs and chemicals. The Signa Chemical Company will erect the manufacturing plant. This water power is on the line of the Rochester division of the Pennsylvania road. The falls are five in number and have a total fall of 75 feet, and are thought capable of developing 1500 horse-power. Niagara Falls and Buffalo capital is interested in the Signa Chemical Company.

The Columbia Supply Company, Columbia, S. C., recently organized, are fitting up a shop for general machine and engine repair work. They intend to add a foundry to their plant, and advise us that they will be pleased to hear from manufacturers of foundry equipment. G. A. Guignard is president and C. Atkinson secretary and treasurer. Mr. Atkinson is also secretary and manager of the Columbia Machine & Iron Works.

The Welsh Machine & Well Works Company of Welsh, La., have organized for the building and operating of machinery for drilling irrigation wells. They will shortly begin the erection of a plant, the equipment for which has been secured. H. W. Lanz, secretary and treasurer of the Lake Charles Carriage & Implement Company of Lake Charles, La., is interested.

It is understood that the Susquehanna Power Company, recently organized by New York, Philadelphia and Baltimore capitalists under the financial direction of the Continental Trust Company of Baltimore, will erect three power plants of about 40,000 horse-power each on the Susquehanna River. The company have signed a contract to supply the Union Electric Light & Power Company and the Mount Washington Electric Light Company with power, and will eventually furnish light and power to a number of Maryland towns, as well as electric railway connections between several of them and Baltimore.

The Norfolk & Hampton Roads Ship Building Company of Norfolk, Va., have been organized and a large amount of the capital stock, which will be over $1,000,000, has been subscribed. It is the intention of the company to build a large plant at Hampton Roads. J. B. Sanford of Baltimore and Norfolk is interested.

The Stanley Electric Mfg. Company, Pittsfield, Mass., have increased their capital stock from $3,000,000 to $4,000,000. The control of the company was recently acquired by a group of capitalists identified with New York, New Jersey and Pennsylvania traction systems, among whom are William C. Whitney, P. A. B. Widener, Thomas Dolan, William L. Elkins, and Thomas F. Ryan.

The majority of the directors of the Cleveland Machine Screw Company of Cleveland have called a meeting for July 11 for the purpose of surrendering and abandoning the corporate authority of the company, and for formal dissolution in the manner provided by law. It is stated that a new charter is to be taken out and the capital stock of the company increased to provide for extensions.

The Ajax Mfg. Company of Cleveland have purchased the property formerly occupied by the Chicago-Cleveland Car Roofing Company, adjoining the Acme factory. They will add another story to the building, giving them nearly double their former floor space.

The Toledo Pipe Threading Machine Company of Toledo, Ohio, have been incorporated with $10,000 by C. F. Carroll, C. F. Collins, C. R. Clapp, W. W. Vosper, Henry R. Thompson and others of Toledo, to manufacture pipe threading machines. It is likely that the company will not do their own work but will let the contract to outside concerns for the present.

The Sandusky Automobile Mfg. Company of Sandusky, Ohio, have had plans completed for their new factory building. It will be 60 x 156 feet and two stories high. The company are preparing to manufacture medium priced gasolene automobiles and will buy considerable new machinery.

Press dispatches state that the Louisville & Nashville Railroad Company will build general repair shops at Louisville, Ky., at a cost of about $1,000,000.

The McMyler Mfg. Company are rapidly completing their new plant at Warren, Ohio, and expect to commence operations shortly after August 1. The company have recently purchased a foundry in Cleveland and will operate it in that city until about December 1, when the equipment will be moved to Warren. At Cleveland the McMyler Company are at work on sev-

eral large contracts for hoisting machinery, among them being a large outfit for London, England, to be used on the deck of ocean liners plying between Florida and England.

The Ohio Brass Company of Mansfield, Ohio, who have recently increased their capital stock to $1,000,000, have commenced work on much needed improvements. They have let contracts for a brick and steel structure 50 x 175 feet, and three stories high, facing the Pennsylvania Railway, to be used as an addition to their warehouse. A building 56 x 350 feet, two stories high, will be erected later. It will be built as an addition to the present machine shop and will be utilized for the same purpose.

The American Laundry Machinery Company, Cincinnati, Ohio, have increased their capital stock to $250,000. They have recently purchased new power equipment.

The machinists in the employ of the Keystone Driller Company, at Beaver Falls, Pa., have gone out on a strike, and the firm are filling up their places with new men as rapidly as possible. The tool makers, blacksmiths and boiler makers employed by this concern also went out on a strike, and after being out about two weeks, went back to work on piece work.

The Grafton Foundry & Machine Company are being organized at Grafton, W. Va. The new concern will expend about $10,000 in the building of a new plant. A committee on machinery and buildings has been appointed consisting of H. M. Leps, T. H. Cather, and C. R. Jones.

Charles McSherry has started a general machine shop on Fifth avenue, Pittsburgh, and will build labor saving metal working machinery and tools. Mr. McSherry is the inventor of the Hercules shears for the cutting of sheet metal of heavy gauges, and for which he is having a very large demand.

Boilers, Engines, &c.

The Newburyport Gas & Electric Company, Newburyport, Mass., contemplate the erection of a new electric plant to cost about $50,000. D. D. Tilton is treasurer and general manager, and C. S. Spaulding superintendent.

The Adams Express Company handled out of Pittsburgh recently a boiler head weighing almost 2000 pounds, shipped by Jones & Laughlins, Limited, to M. Zier & Co., New Albany, Ind. This head was used to complete the construction of a large filter plant for the Colorado Fuel & Iron Company. In 48 hours after its arrival at New Albany the plant was loaded on a special car provided by the Santa Fe Railway company and started on a record breaking trip across the continent.

The Michigan Engine Company, Allegan, Mich., recently incorporated, have leased a fully equipped shop, where for the present they will build engines exclusively. Later they expect to take up the manufacture of boilers. T. S. Updyke is secretary and treasurer.

The Water Works Department at Mansfield, Ohio, will install two new boilers of about 2200 horse-power each.

The Glauber Brass Mfg. Company of Cleveland have purchased the old power house of the Cleveland City Railway Company in Cleveland and will equip same for their business. The power house has been out of use since the cable railway was dispensed with, and it is one of the strongest and best looking buildings of its class in the city. The building will be thoroughly remodeled. A power plant for driving all machinery will be installed. When improvements are completed, it is claimed the plant will be one of the best equipped of its kind in the country.

The Salem Electric Company, Salem, N. J., will build a new power plant, equipment for which has been purchased as follows: One 80-kw. 60-cycle and one 65-kw. 60-cycle Stanley light machine; one 125 horse-power 4-valve and one 90 horse-power single valve Russell engine, Pittsburgh transformers, and Helios-Upton arc lamps.

A. Lahnis, secretary Board of Public Works, Zeeland, Mich., advises us that plans and specifications for a 1500-light electric plant and water works are now ready and bids are asked for equipment, to include two steam pumps of 1,000,000 gallons capacity each, two 125 horse-power water tube boilers, &c.

Foundries.

The new plant of the Fort Pitt Malleable Iron Company of Pittsburgh at McKee's Rocks is now running to full capacity. The works are equipped with the latest appliances for foundry work, having a capacity of 75 tons daily. The building is 170 x 400 feet, with a saw tooth roof. The company have 11 acres of ground and have under consideration the building of an addition for the manufacture of steel castings. The company are composed of J. C. Riley, president; M. J. McMahon, vice-president; Frank J. Lanahan, secretary and treasurer; E. S. Riley, general manager, and John Ryan, foundry superintendent, who, with H. G. O'Brien and C. F. Holdship, comprise the Board of Directors. Main offices are in the Shannon Building, Pittsburgh.

Articles of incorporation of the Shaw Steel Casting Company of Milwaukee, Wis., have been amended, changing the name of the company to the Bay View Steel Casting Company.

The S. Obermayer Company of Cincinnati, Ohio, manufacturers of foundry equipment and supplies, have recently furnished complete equipment, including cupolas, tumblers, ladles, foundry facings and supplies of all kinds, for the foundries of the Peck-Williamson Heating & Ventilating Company, Williston, Ohio; Superior Gas Engine Company, Springfield, Ohio; the Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio, and the new technical foundry of the Armour Institute.

The Columbia Supply Company, Columbia, S. C., are in the market for complete foundry equipment. C. Atkinson is secretary and treasurer.

The Steiger & Kerr Stove & Foundry Company, San Francisco, Cal., have purchased a lot at Eighteenth and Folsom streets, upon which they are erecting a mounting and storage building, 50 x 150 feet; two foundry buildings, 50 x 130 feet each; carpenter shop, pattern rooms, &c. The new plant will be equipped with the machinery from the old one, and, with the exception of motors and elevators and a No. 7 or 8 Sturtevant fan, no new equipment will be required.

The Pittsburgh Steel Foundry of Pittsburgh, with foundry at Glassport, Pa., have given their machinsts, cranemen, blacksmiths and laborers an advance of 5 to 10 per cent. in wages, dating from July 1. The molders will be paid the regular molders' scale adopted in Pittsburgh recently.

The strike of the molders at Youngstown, Ohio, has been settled. The molders will receive $2.90 per day in the future. The old rate was $2.75 and the men demanded $3 per day.

Bridges and Buildings.

The Electrical Equipment Company of Chicago have been awarded the contract for an addition to the Whiting Electric Light Company's plant, at Whiting, Ind.

The Northern Ohio Traction Company of Akron, Ohio, have placed a contract with the King Bridge Company of Cleveland for a viaduct, to be of steel and concrete construction, costing $50,000, to be erected over the Cuyahoga River near Cuyahoga Falls. It is to be completed by January, 1903.

The Philadelphia Company of Pittsburgh have given a contract to the American Bridge Company of Pittsburgh for steel frame buildings to be erected on Brunot's Island, Pittsburgh, and which will require about 1200 tons of steel. The Philadelphia Company intend to build a very large power house on Brunot's Island to supply power to the Pittsburgh Railways Company, an identified interest. Contracts for most of the equipment were placed some time since.

Fires.

The plant of the Capewell Horsenail Company, at Hartford, Conn., was destroyed by fire July 3, entailing a loss of about $250,000, with insurance of about $180,000. It is understood that the plant will be rebuilt.

N. D. Stanley's machine shop, at Essex Junction, Vt., was destroyed by fire July 5. The loss is about $4000.

The Cummings Flour Mills, at Oswego, N. Y., were destroyed by fire July 8. The loss is about $250,000.

The Lehigh Valley Traction Company's electric light plant at Allentown, Pa., was recently destroyed by fire.

Hardware.

Dempster Mill Mfg. Company, Beatrice, Neb., manufacturers of wind mills, pumps, tanks, grain drills, well machines, cultivators, &c., have during the past 18 months made a number of substantial improvements in their plant by which the capacity of their foundry, machine shop and warehouses has been materially increased. They have also added a galvanizing plant. The company refer to the success which they have met in introducing their gasoline engine, which is referred to as a new departure as compared with most of other makes.

The Cream City Woven Wire Company, Milwaukee, Wis., have taken out a permit to erect a large factory at Thirty-second street and Fond du Lac avenue, in that city. The factory and boiler house will cost $28,000 and will be constructed of brick and stone. The main building will be 152 x 131 feet and four stories in hight; the boiler house will be 52 x 45 feet.

The Enterprise Mfg. Company, Philadelphia, are contemplating an enlargement of their lumber storage yard and the building of a new and larger kiln for drying lumber. They will also erect a new and modern stable. The ground floor area of the proposed addition will be 80 x 120½ feet.

The Sun Mfg. Company, Greenfield, Ohio, manufacturers of cash registers, coffee mills, rat traps, wooden ware specialties, &c., have been obliged to materially increase their capacity in view of the demand for their products. Especially is this the case with cash registers, dealers realizing, the company advise us, that theirs is an efficient machine offered at a moderate price.

The D. W. Bosley Company, manufacturers of weather strips, Chicago, Ill., have just completed a new factory at Fulton and May streets. The building is of mill construction, 100 x 141 feet, and three stories in hight. The company's sales for the season of 1901 aggregated about 10,000,000 feet, and contracts now in hand promise a decided increase over these figures for the coming season.

The Champion Iron Company, Kenton, Ohio, whose plant was destroyed by fire on April 23 last, are putting up new and

much more modern buildings in every particular, and hope soon to be in far better shape for handling structural and ornamental iron work, jail and prison work, gray iron castings and fence work than ever before.

The Transue & Williams Company, Alliance, Ohio, have just completed an addition to their forging department which will increase their capacity about 50 per cent. The company are manufacturers of high grade forgings of every description in iron, steel and copper.

The Jenison Iron & Steel Shops, Limited, Grand Rapids, Mich., announce that they are prepared to make sash weights on a large scale. They have at present a capacity of about 20 to 25 tons daily.

Miscellaneous.

The Magnus Metal Company of Buffalo, N. Y., have taken out a permit to build a $75,000 factory, 100 x 350 feet, at Fortieth street and Emerald avenue, Chicago.

The Pontiac Sheet Metal Mfg. Company have purchased the Van Kleek property on East Huron street. The factory here will be a branch of the one in Windsor and until it can be started here goods will be supplied from the Windsor branch.

The Ohmer Car Register Company, Dayton, Ohio, have reorganized and will enlarge their quarters, increasing their facilities for manufacture.

The Eaton-Hurlbut Paper Company, Pittsfield, Mass., have prepared plans for a further enlargement of their plant by the erection of an addition to cost about $10,000. The building will be 50 x 100 feet, two stories, of heavy mill construction, and will be equipped with automatic sprinklers.

The Whitlock Printing Press Mfg. Company, Derby, Conn., have plans under way for a two-story brick addition, 60 x 70 feet, to their plant, which will be used as office and draughting room, pattern shop and store house.

A company, to be called the Ninety-six Cotton Mill, are being organized with a capital stock of $200,000, at Ninety-six, S. C., by E. M. Lipscomb of that place, and Ellison A. Smyth of Pelzer. They will erect a 10,000-spindle cotton mill, plans for which are now being prepared. Most of the machinery has been secured.

A new company, under the name of the Tonawanda Board & Paper Company, have selected a site on Goose Island, at Tonawanda, N. Y., and will erect a paper mill. Marion, Ind., parties are interested, and the capital is $600,000. The buildings will be two stories high, the main structure to be 80 x 250 feet and to face on Tonawanda Creek. Another building will be 80 x 200 feet, and the third 100 x 150 feet. The most improved machinery will be installed, and the output of the plant is expected to be about 60 tons of paper and paper board a day. The directors are: Louis Newman, John W. McCleary, Perce Norton, Fred O. Gabhardt, Louis S. Works of Marion, Ind.; John W. Lovett of Anderson, Ind.: Eli Mosenfelding, Rock Island, Ill., and Louis T. Payne, North Tonawanda, N. Y.

The Basic City Car Works, at Basic City, Va., have been sold under trust deed and bought by Isaac Witz of Staunton, for the company. The plant is for sale at a low figure. It originally cost $70,000, has a good foundry and blacksmith shop attached, and is equipped with improved machinery, engine and Babcock boiler of 100 horse-power.

The Royer Wheel Company, Aurora, Ind., have plans prepared for rebuilding their plant, which, with the exception of the dry houses and storage sheds, was recently destroyed by fire. There will be three buildings, 50 x 150 feet each, two stories and basement, of mill construction, and a warehouse 50 x 150 feet. The factory will be equipped with sprinkler system and modern machinery, most of which has been purchased from Bentel & Margedent of Hamilton, Ohio. The boilers are intact, but the three engines of 350 combined horse-power, are somewhat damaged, and it is possible that a new engine will be put in to do the work.

The Calkins Company, Los Angeles, Cal., have incorporated for the manufacture of zinc shavings for cyanide plants, mine and laboratory supplies, machinery, cyanide tanks, mills, &c.

The J. H. Gillon Machine Company and others of Waycross, Ga., are organizing a company for the manufacture of flat cars. It is probable that the company will be capitalized at about $60,000, and a plant erected some time this summer.

The Auto Vehicle Company, Los Angeles, Cal., will shortly move into new and permanent quarters.

The Toledo Computing Scale & Cash Register Company of Toledo have disposed of their cash register business, and it is reported that it has passed into the hands of the National Cash Register Company of Dayton. In the future the Toledo company will devote all their energies to the manufacture of computing scales, and to this end will erect an addition to their plant in Auburndale. The company are now capitalized at $1,000,000.

The Kirk-Latty Mfg. Company of Cleveland have lately absorbed the business of the Metal Goods Mfg. Company of that city. They have just completed two new additions to take care of the increased work and have started work on a third. The new line includes toy wagons, velocipedes, wheelbarrows and wire wheels for baby cabs. The company claim they will shortly have the largest business in this class of goods in the country.

It is probable that a plant will be erected at Youngstown, Ohio, to make steel cars under the Summers patents. Tests of freight cars built under these patents are said to have been very satisfactory. It is possible that Henry and Hugh B. Wick of Youngstown may be identified with the plant if it is built.

The United States Brass & Mfg. Company, at Warren, Ohio, have gone into the hands of a receiver, and the concern have made a proposition to their creditors to pay 35 per cent. of their claims prior to July 15, to be regarded as a settlement in full. It is likely that most of the creditors will accept the proposition. The assets are given as $7000 and the liabilities as $33,000. The plant is idle at present.

In the United States Circuit Court at Pittsburgh, on Monday, July 7, an affidavit of defense was filed in the equity suit of the Standard Sanitary Mfg. Company against James W. Arrott, Jr., an action to compel the defendant to deliver to the plaintiff certain letters patent on improvements in dredges for pulverulent materials. The defendant says the plaintiffs were allowed by him to manufacture the articles, for which they were to pay him a royalty.

Fast progress is being made on the buildings of the Standard Steel Car Company, at Butler, Pa., and it is said the main building is more than half finished. This concern expect to be making steel cars in their new plant early in September.

The Situation in the Welsh Tin Plate Industry.—Since the Conciliation Board came into existence in the Welsh tin plate trade three years ago wage contracts have been entered into annually, and the existing contracts end on June 30. It is claimed that the three past years under conciliation have been a period of absolute freedom from serious strikes. Masters and men have brought into existence a Wage Dispute Board. This board appeared to be doing good work and making good headway until a few months ago, when the Duffryn mill men, members of the Smelters' Union, presented notices without consulting the board. The union demand for receiving payment on "area" caused some resentment among the employers, though they eventually agreed that payment should be, as asked for, on area pure and simple, the effect being to accord an advance in wages of some 2 per cent. on about 3,000,000 boxes of plates. "Canadas" and "doubles" had always been paid for exceptionally—that is, the men did not work a box up to the standard of 31,500 square inches per box on those sizes. The employers asked the men to give this up and to accept payment on area on these exceptional plates. But the men refused, and hence the dispute.

More iron ore was handled by the Bessemer & Lake Erie Railroad of the Carnegie Company last month than during any like period in the history of the road. The previous record was for August of last year, when 491,000 gross tons were handled and shipped over the Conneaut docks. During June, 1902, there were 555,370 gross tons of iron ore handled by the Bessemer & Lake Erie road. This was done with the usual amount of equipment, and it is predicted that with the eleven new engines, which will be received from the Allegheny shops about the middle of this month, another record will be made in July.

Officials of the Amalgamated Association of Pittsburgh will make the bi-monthly wage adjustments next week. In the tin plate and sheet scales the selling prices of the past two months will not warrant any advance to the men. In the puddling and bar iron scales it is possible the average price of shipments of iron bars in May and June may warrant a slight advance to puddlers and finishers, but this is not certain.

The Carnegie Steel Company have recently bought a strip of land fronting on the Monongahela River, between Duquesne and Homestead, a distance of 6 miles. The price paid was $43,000, or $10.75 an acre. It was the only piece of property between Duquesne and Homestead not occupied by some of the mills of the Carnegie Steel Company.

The Iron and Metal Trades.

Everything seems to conspire to keep the Pig Iron production below the full capacity of the country. Considering all the circumstances the record of June, with an output of 1,478,456 gross tons, was a good one, and if everything goes well the July production should go considerably above the 1,500,000 ton mark. There were in blast on the first of this month blast furnaces whose aggregate capacity is 352,590 tons per week, but the Anthracite strike is still troubling the Lehigh furnaces, and now complaints are becoming more frequent and more urgent that the Coke makers who are running are not able to keep their customers regularly supplied. While the strike of the miners in the Birmingham district is not absolutely settled, pending a final meeting to-morrow, it is believed that an agreement will be reached.

Nearly all the troubles in the Pig Iron market thus far have fallen upon the makers of Foundry Iron, and have put the founders into serious difficulties. There is some scarcity of Pig Iron for Steel manufacture, but it does not involve any serious shortage, and the great mills have little inconvenience from that source.

Interest therefore centers in the Foundry trade, and it appears to be the Chicago district which is monopolizing a large business for delivery in 1903. A local furnace company are reported to have sold 75,000 tons for the first half, thus with previous sales disposing of their entire product. Further large inquiries, including one for 28,000 tons, are in that market.

In the Steel market matters are taking a somewhat different turn. In the Central West the summer slackness in the Wire and Sheet trades is causing a shutting down of mills, who in turn are offering for resale both domestic and foreign Billets and Sheet Bars. In addition thereto, quite a good deal of new capacity of Open Hearth Steel is appearing in the markets. It looks, therefore, as though there may be an early readjustment in the Steel trade, which will bring this raw material more in line with the finished products. The first effect of a lowering in the price would probably be a check in the importations.

In the heavy finished products the great activity continues unabated. In addition to the order for Steel Rails placed by the Pennsylvania Railroad, the Northern Pacific has entered 40,000 tons, and other Western roads have also closed for their requirements. There are reports that some round blocks of English and German Rails are being offered at prices which look as though they might lead to business.

In the Plate trade the orders for the Lake steamers have been booked, Chicago taking about 5000 tons and Eastern mills a like quantity. The Shapes have also been ordered. The Structural trade continues exceedingly active, and there is no easing in sight.

It is, however, when we turn to the lighter branches of the Iron and Steel trade that some uncomfortable developments are encountered. There is a distinctly weak feeling in Sheets and some dullness in Tin Plate. The Wire trade has been falling off in volume, and a number of works have been forced to close down.

In Iron Bars, too, there have been reports of shading, while the Tube trade is reported to be quiet.

Spelter continues its advance. The other metals are rather dull.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

At date, one month and one year previous.

	July 7, 1902.	July 2, 1902.	June 11, 1902.	July 10, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$22.75**	22.75	20.50	14.75
Foundry Pig No. 2, Southern, Cincinnati	**20.75**	20.75	19.75	12.75
Foundry Pig No. 2, Local, Chicago	21.00	....	21.50	15.00
Bessemer Pig, Pittsburgh	21.25	21.50	21.75	16.00
Gray Forge, Pittsburgh	**21.00**	21.00	20.00	13.50
Lake Superior Charcoal, Chicago	**25.00**	24.00	23.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	*31.25*	32.00	32.00	24.00
Steel Billets, Philadelphia	29.50	29.50	....	....
Steel Billets, Chicago	....	....	....	....
Wire Rods, Pittsburgh	*36.00*	36.00	37.00	36.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.80
Splice Bars, Tidewater	1.90	1.90	1.80	1.50
OLD MATERIAL:				
O. Steel Rails, Chicago	*18.50*	18.50	19.00	12.50
O. Steel Rails, Philadelphia	21.00	21.00	21.00	....
O. Iron Rails, Chicago	24.00	24.00	24.00	18.50
O. Iron Rails, Philadelphia	25.00	25.00	24.50	....
O. Car Wheels, Chicago	**21.00**	21.00	20.50	16.50
O. Car Wheels, Philadelphia	**20.50**	20.50	19.50	....
Heavy Steel Scrap, Chicago	19.00	19.00	19.00	12.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.95	1.95	2.00	1.55
Common Iron Bars, Chicago	1.75	1.75	1.75	1.55
Common Iron Bars, Pittsburgh	*1.75*	1.80	1.80	1.40
Steel Bars, Tidewater	1.90	1.90	1.90	1.60
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.40
Tank Plates, Tidewater	2.00	2.00	2.00	1.75
Tank Plates, Pittsburgh	1.75	1.75	1.60	1.60
Beams, Tidewater	**2.25**	2.25	2.00	1.75
Beams, Pittsburgh	*1.60	*1.60	1.60	1.60
Angles, Tidewater	**2.25**	2.25	2.00	1.75
Angles, Pittsburgh	*1.60	*1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	*2.10*	2.15	2.15	1.82½
Skelp, Sheared Iron, Pittsburgh	*2.15*	2.25	2.35	1.90
Sheets, No. 27, Pittsburgh	2.90	2.90	2.90	2.90
Barb Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	*12.00*	12.12½	12.25	17.00
Spelter, St. Louis	**4.90**	4.85	4.65	....
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	3.97½	3.97½	4.00	....
Tin, New York	*28.25*	28.00	30.50	27.25
Antimony, Hallett, New York	**8.37½**	8.37½	8.00	8.75
Nickel, New York	50.00	50.00	50.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

Chicago

FISHER BUILDING, July 9, 1902.—(*By Telegraph.*)

The result of the scarcity of Pig Iron and the lack of Coke has been an advance of $2 to $3 per ton on Southern Iron for delivery during the remainder of the current year and for immediate shipment even higher premiums have been obtained. Most consumers of Pig Iron in the West are facing very serious conditions, and in many instances are obliged to pay excessive prices or suspend work. Announcements by some Southern furnaces indicate that deliveries, already bad, are likely to be worse, because of strikes. The market is being literally scoured for prompt delivery Iron. Aside from these factors the further large sales of Pig for delivery during the first half of next year have been the most conspicuous feature. Sales for the week have aggregated about 50,000 tons, with further large buyers in the market at the close. The Bar Iron market has lost some ground during the week, the 1.75c. rate having been shaded and considerable business taken. Active competition seems to be at the root of the trouble, high prices for Pig Iron and Scrap seeming not to deter sales of Bars on a lower basis. There has been more activity in Structural Material and Heavy Plates, 10,000 tons of Plates and 1000 tons of Structural Shapes having been placed for lake steamers. The buying movement of Heavy Rails for the first of 1903 has continued active, about 69,000 tons having been taken here and 175,000 tons in the East. This brings the total tonnage for 1903 to about 1,000,000 tons, and it is anticipated that about 1,000,000 tons more will be placed before the needs of the railroads for next year will have been supplied. There have been more sales of foreign Billets for July shipment, and a little firmer tone has been developed for domestic Billets. Old Material

has continued strong, with moderate offerings and a good demand. The inauguration of a freight handlers' strike at all the railroad warehouses in Chicago on Monday has interfered seriously with shipment of freight during the past few days, but several of the railroads are accepting freight at the close.

Pig Iron.—Aside from the scarcity of Iron for anything like near delivery and the almost famine condition of the Coke market buying for next year is the most conspicuous feature. One local furnace company are said to have taken orders for their entire output up to next June, which means about 75,000 tons for next year, and added to orders already placed makes an aggregate of fully 100,000 tons which has been sold during the past two or three weeks. There have been, too, a number of different lots of Southern Iron ranging from 1000 to 3000 tons each, which have been sold for delivery for the first and second quarter of next year. Seventeen dollars seems to be the accepted basis for No. 2 Southern Foundry, at Birmingham, while $21 is the prevailing price for No. 2 Northern Foundry, Chicago. By far the largest proportion of trading for Northern Iron has been done during the past week, and at the present time there are several large buyers in the market, one agricultural implement manufacturer seeking to place an order for about 28,000 tons. As far as spot Iron or indeed Iron for almost any delivery for the remainder of the current year is concerned, the market is in a critical condition, with an unsettled feeling and irregular prices. The mainspring of the difficult is the labor trouble at the mines. The lack of Coke and other fuel is now seriously felt in the South as well as in Pennsylvania. West Virginia and Tennessee, and more and more foundries throughout the Central West are feeling the ill effect of the inadequate supply of both Iron and Coke. While most of the business transacted is for next year's delivery there are occasional transactions for delivery during the third and fourth quarters of the current year, some Virginia as well as local and Southern Iron having been disposed of during the past few days. As a rule, however, it is almost impossible to obtain Iron in any appreciable quantities for this year's delivery. The action of the Tennessee Company in issuing a circular to customers calling attention to a provision in their contracts which absolves the furnace company from fulfilling the terms of delivery upon the advent of a strike, which has now taken place, has increased the anxiety, if not alarm. Deliveries, already bad, are likely to be much worse, which increases the urgent demand for spot metal, and where immediate delivery Iron has been available very high prices have been paid. Some encouraging reports have been received from the Pocahontas Coal field district, but no practical relief has come from that or any other quarter thus far. Among the sales at the close are several hundred tons of No. 1 Foundry at $24.65 for August, September and October delivery, 1902, and $25.65 for immediate shipment. No. 2 Foundry has sold at $24.15 to $24.65 for immediate delivery, and Ohio Silvery at $27.10. The following are the approximate prices current at the close for delivery during the third and fourth quarters of the year:

Lake Superior Charcoal	$25.00 to $26.00
Local Coke Foundry, No. 1	22.00 to 22.50
Local Coke Foundry, No. 2	21.00 to 21.50
Local Coke Foundry, No. 3	21.00 to 21.50
Local Scotch, No. 1	22.50 to 23.00
Ohio Strong Softeners, No. 1	24.00 to 25.00
Southern Silvery, according to Silicon	24.65 to 25.15
Southern Coke, No. 1	24.15 to 24.65
Southern Coke, No. 2	23.65 to 24.15
Southern Coke, No. 3	23.15 to 23.65
Southern Coke, No. 1 Soft	24.15 to 24.65
Southern Coke, No. 2 Soft	23.65 to 24.15
Foundry Forge	22.65 to 23.15
Southern Gray Forge	22.65 to 23.15
Southern Mottled	22.65 to 23.15
Southern Charcoal Softeners, according to Silicon	23.00 to 24.00
Alabama and Georgia Car Wheel	26.50 to 27.00
Malleable Bessemer	23.00 to 23.50
Standard Bessemer	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	25.10 to 26.15

Bars.—Notwithstanding the fact that Pig Iron is strong at an advance, and Scrap is scarce and proportionately higher than ever before, there is an easy feeling in the Bar Iron market, there having been further sales of considerable quantities at 1.75c. to 1.80c. In several instances even 1.75c. has been shaded. While most mills agree that upon the basis of present prices there is no profit in making Iron Bars, the active competition between Steel and Iron and also among the Bar Iron mills themselves is causing the present unsatisfactory condition of the market, consumers apparently being the only ones benefited. Bar Iron is quotable at 1.75c. to 1.80c. Soft Steel Bars have been in good demand in moderate amounts and a strong tone has continued to prevail, with sales ranging from 1.75c. to 1.90c. Hoops have continued firm at 2.15c. to 2.25c., and Angles at 2.25c., base, mill shipment. The jobbing demand has continued as active as ever, notwithstanding it is the middle of the summer season. Soft Steel Bars are selling at 2c. to 2.25c., Angles at 2.50c., Hoops at 2.50c., base, from store.

Structural Material.—The general character of the market is unchanged, but there has been considerable activity, although individual transactions have not been large. In the aggregate orders for about 6000 tons have been placed for next year's delivery during the week, in addition to about 1000 tons for lake steamers, contracts for which were recently placed. For domestic Steel mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Small lots of Beams and Channels from local yards are quoted at 2.50c. to 3.50c.; Angles, 2.50c. to 3.50c. rates; Tees, 2.55c. to 3.50c. rates.

Plates.—The market continues extremely active and very strong, and while prices are not quotably higher, where mills accept new business for anything like near delivery they are demanding and obtaining an advance of about $5 per ton over the established prices, and the same is true of Structural Material. Orders for about 10,000 tons have been placed for the lake steamers, contracts for which were recently placed, 5000 tons being taken by local mills and 5000 tons going to the East. The nominal mill prices are as follows: ¼-inch Steel Tank and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. A number of urgent orders of considerable tonnage have been booked to be delivered from store. Prices are, however, unchanged, as follows: Tank Steel, ¼-inch and heavier, 2.30c. to 2.50c.; Tank Steel, No. 8, 2.45c. to 2.55c.; Flange, 2.40c. to 2.75c., all f.o.b. warehouse, Chicago.

Sheets.—Heavy Sheets are still well sustained, but all others continue slow and weak, with liberal discounts allowed, especially on Galvanized Sheets. No. 27, Black Sheets, 3.15c. to 3.25c., Chicago, for mill shipment, while small lots from store are quotable at 3.45c. to 3.55c. Galvanized Sheets, mill shipment, are offered at 4.45c. to 4.50c., with discounts of 75c. and in some cases even greater, but small lots from store are held at 4.70c. to 4.75c. for No. 27.

Cast Pipe.—There has continued to be considerable activity and a very strong tone has continued to prevail, in sympathy with Pig Iron. Among the more important sales of the week have been 4000 tons to Kansas City, sizes ranging from 6 to 36 inches, as ordered; 1000 tons to Canton, Ohio, 8, 10 and 12 inches, and 800 tons to Seattle, Wash., sizes running from 6 to 12 inches. In addition there has continued to be a good demand from independent companies, prices obtained being on the basis of previous quotations. Manufacturers quote Cast Iron Water Pipe as follows: 4-inch, $34.75; 6-inch, $33; 8-inch and upward, $32; Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—There has been a moderate demand, but a firm tone has continued to prevail, prices being unchanged. Carloads are quoted as follows, random lengths: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a moderate volume of business and a firm market. Prices for mill shipment are as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

The demand from store has been moderate and the market has continued both steady and firm, prices being as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—The demand has continued fully as active as ever, but especially for Tire and Spring Steel. One of the largest mills reports that the record of the month of June was the largest June, both in tonnage and in value, ever experienced. The market for Tool Steel has preserved the features previously noted, with a fair volume of business and without essential change in prices. Mill shipments are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—Three additional orders for Heavy Sections have been placed by Western railroads during the week, aggregating 69,000 tons, for delivery in 1903. It is also reported that the Pennsylvania Railroad have finally placed their order for 1903, aggregating 175,000 tons, distributed among three Eastern mills. This brings the total tonnage sold for next year's delivery to about 1,000,000 tons, about half of which has been taken at Chicago. The established price for Heavy Sections is well known to be $28 at mill, but it is almost impossible to place new orders for delivery for any time during the current year. Dealers are offering both foreign and domestic Rails to a moderate extent at a premium of $2 to $3 over price fixed by the four Rail interests for fall delivery. There has continued to be a good demand for Light Sections, with moderate sale of 12's, 16's and 20's, prices ranging inversely from $35 to $40. Track Supplies of all kinds continue to be in urgent demand and strong. Fastenings are quoted in carload lots: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts,

with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—A little firmer tone has been developed in the market for domestic Billets, there being fewer offered and a more active demand. Moderate sales have been made on the basis of $35 to $38 for carloads, with smaller quantities ranging up to $40, according to buyer, analysis and time of delivery. Two thousand tons of foreign Basic Billets have bene sold at between $32.50 and $33 for July shipment.

Old Material.—Although a few mills are covered by contracts for several months ahead, there is an active demand for all Scrap and the market continues very firm, with full prices realized for various grades. There have been sales of 5000 tons of Old Steel Rails, long lengths, at $24.25 for shipment to the East and about 500 tons at the same price for local consumption. A lot of several hundred tons of Relaying Rails has been sold as high as $33.25. The following are the approximate quotations per gross ton:

Old Iron Rails	$24.00 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.50
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	32.00 to 33.00
Old Car Wheels	21.00 to 22.00
Heavy Melting Steel Scrap	19.00 to 21.00
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.00 to $23.00
Iron Car Axles	25.00 to 26.00
Steel Car Axles	22.00 to 23.00
No. 1 Railroad Wrought	21.00 to 22.00
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	18.50 to 19.00
No. 1 Dealers' Forge	16.50 to 17.00
No. 1 Busheling and Wrought Pipe	14.50 to 15.50
Iron Axle Turnings	14.50 to 15.50
Soft Steel Axle Turnings	13.50 to 14.00
Machine Shop Turnings	13.75 to 14.25
Cast Borings	9.25 to 9.50
Mixed Borings, &c	9.50 to 10.25
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	14.50 to 15.00
Stove Plate and Light Cast Scrap	11.00 to 11.50
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	15.00 to 15.50

Metals.—The Copper market has remained easy, but prices have been well sustained, carload lots being quoted at 12⅛c., while jobbing sales have been made at 12½c. to 12¾c. Pig Lead continues firm, with a good demand at 4.05c. for Desilverized in 50-ton lots and 4.07½c. in carload lots. Sheet Zinc has remained firm at the recent advance to 6½c. in carload lots and 6.65c. in lots of 600 lbs. The demand for Old Metals has been light and the market has remained easy for both Copper and Brass, but Zinc has continued firm. Prices are unchanged, as follows: Heavy Cut Copper, 11¼c.; Red Brass, 11¼c.; Copper Bottoms, 10c.; Lead Pipe, 3.80c.; Zinc, 3½c.

Coke.—The local supply is far below the needs of consumers and with an active demand much higher prices have been obtained. Connellsville 72-hour Foundry Coke is wanted at $6. Virginia and West Virginia is nominally quotable at $6, but sales have been made of all kinds as high as $7 during the week.

Philadelphia.

FORREST BUILDING, July 8, 1902.

Quiet conditions have prevailed during the past week in the Iron and Steel trades. Preparations for the usual holiday, which this year has extended practically over three days, have had their usual influence on the trade and very little business has been transacted, and then only what was absolutely necessary. The midyear stock taking, shut down of plants for geenral overhauling and repairs are generally attended to at this time and some quietness in the trade is not unusual, but rather expected. The difficulty of obtaining supplies of raw material and fuel continues. The Anthracite Coal situation remains unchanged, and the effect upon the Iron trade is being felt in the banking and blowing out of a number of furnaces dependent on Anthracite as a fuel. This has already reduced the local output to the extent of something like 8000 to 9000 tons per week, and as similar decreases are going on in other districts prospects for adequate supplies of Pig Iron are very discouraging The suspension at the mills during the next week or so may help matters to a slight extent, but the shortage of Pig Iron and fuel and delayed deliveries on other materials will no doubt cause considerable worry before normal conditions can be reached. The demand for Plates and Structural Material continues active and good business is being done in these lines. Deliveries, however, are not very prompt, Structural Shapes particularly being very hard to get.

Pig Iron.—There has been practically nothing done in the Pig Iron market during the past week. The scarcity of metal continues and there are no indications for improvement in sight. Sellers have virtually sold up for some time ahead and are making no offerings. There is no tendency toward concessions for next year's deliveries, the only guarantee for delivery being a promise to ship as early as possible. A number of furnaces have been compelled to suspend for want of fuel, and others will no doubt be forced to do so unless better supplies are to be had. Fuel is practically unobtainable, although double prices are offered for prompt delivery. A fair average of prices for deliveries in buyers' yards or nearby points would be about as follows for deliveries during the last quarter of the year, July, August and September deliveries being anywhere from $1 to $2 higher:

No. 1 X Foundry	$23.50 to $24.50
No. 2 X Foundry	22.75 to 23.50
No. 2 Plain	22.25 to 22.50
Standard Gray Forge	20.00 to 20.50
Ordinary Gray Forge	19.00 to 19.50
Basic	21.00 to 22.00
Low Phosphorus	23.00 to 23.25
No. 3 Middlesbro } Prompt shipments	21.75 to 22.25
Scotch Irons	22.75 to 23.50

Billets.—The market continues inactive, with little Steel offering. Prices are nominally about $33.75 to $34.75 for American and $30.50 to $31.50 for foreign.

Plates.—Orders for a good daily tonnage continue to be taken, with plenty of business in sight. Difficulty is experienced in making deliveries promptly and consumers in some cases are offering premiums for prompt shipment. Prices continue firm as last quoted, viz.: Small lots, 2.10c. to 2.15c. Carload lots and upward: ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is no change in the general situation and deliveries are hard to get; 2.35c. to 2.75c. continues to be quoted for foreign Beams, Angles or Tees, exship or from store, and all the arrivals are promptly taken. Mill shipments are said to command 2.75c. to 3c., f.o.b. sellers' mills, for reasonably prompt delivery.

Bars.—There is said to be an improvement regarding the demand for Bars. The local mills have a large tonnage booked ahead, which will keep them busy for some time, and prospects generally are considered very favorable. Refined Bars are quoted at 1.95c. to 2c., carload lots and upward, and Steel Bars nominally at 1.90c. to 2c., but the latter are rather hard to get.

Sheets—Continue in fairly good demand. The tendency on the part of the buyer for long time orders continues, but is not encouraged by most of the local manufacturers, who prefer to do a regular business at the ruling prices. Ordinarily prices are about as follows for best Sheets in carload lots, Common Sheets one to two-tenths less: Nos. 10 and 12, 2.40c. to 2.60c.; No. 14, 2.70c.; Nos. 16 and 17, 3c.; Nos. 18-21, 3.30c.; Nos. 26, 27, 3.40c.; No. 28, 3.50c.

Old Material.—There is no active demand at present. Large consumers are fairly well stocked up and the market is quiet. Prices are unchanged from last quotations, which were within the following limits for deliveries in buyers' yards:

Old Steel Rails	$21.00 to $21.50
Heavy Steel Scrap	21.00 to 21.50
Low Phosphorus Scrap	27.50 to 28.25
Old Steel Axles	27.50 to 28.50
Old Iron Rails	25.00 to 26.00
Old Iron Axles	29.00 to 30.00
Old Car Wheels	20.50 to 21.50
Choice Scrap, R. R. No. 1 Wrought	23.00 to 24.50
Country Scrap	18.75 to 19.75
Machinery Cast	17.75 to 18.75
No. 2 Light Scrap (Forge)	18.00 to 19.00
No. 2 Light Scrap (Ordinary)	15.50 to 16.50
Wrought Turnings	16.50 to 18.00
Wrought Turnings, Choice Heavy	18.50 to 19.00
Cast Borings	10.50 to 11.00

Cleveland.

CLEVELAND, OHIO, July 8, 1902.

Iron Ore.—The movement of Iron Ore has been somewhat impeded during the last week by a recurrence of the delays that were so much of a factor in the trade earlier in the season. The boats now seem to have collected at the unloading ports on Lake Erie in greater numbers than the docks can take care of, and the delays in consequence have amounted to between three and five days to each vessel. At the same time there is a good supply of boats at the head of the lakes, which is, however, diminishing as the delay at the lower docks increases. The rates of carriage do not change from 75c. between Duluth and Ohio ports, 65c. from Marquette and 55c. from Escanaba. The report of the movement of Ore down the lakes for June has just been completed. It shows that the shippers sent away from the head of the lake ports during June 3,751,696 gross tons, and that the movement up to July 1 this year amounts to 8,899,833 gross tons, an increase for the month of June of 377,863 over the shipment of last year in that same month, and an increase to July 1 this year over that to a similar date last year of 3,936,225. The increase to July 1 will equal, perhaps, the biggest month's business of this year, for while the shippers will strive to move 4,000,000 tons during July and August they will hardly exceed the figure named as the increase.

Pig Iron.—The furnaces in the Valleys are conning the possibilities of being compelled to bank their fires in a

short time unless the supply of Coke immediately and materially improves. The scarcity in the supply of this material began to appear as soon as the strike in the Pocahontas district started and the Connellsville district ovens began trying to fulfill the needs of the territory dependent on the Pocahontas ovens. The shipment of Coke to other fields to relieve the distress there brought back the evidences of a shortage in this territory, from which the furnaces in the Mahoning and Shenango valleys have not been entirely relieved since the severe shortage earlier in the year. As it is, the failing of the supply has compelled the furnaces to use up what little stocks they had collected, and they are now depending entirely upon their supply from the ovens, which seems at times to be intermittent. In the foundry grades the supply of material for delivery during the third and fourth quarters is not very large, although there are evidences all the while that some material is finding its way to the market for the fourth quarter delivery. Even these amounts will not meet the demands of the consumers, and the latter class persists in buying material past the first of next year. The sales have been very heavy at the prevailing prices of $22 for No. 2 Foundry. The market, however, presents the peculiar situation of the consumers forcing the buying, while the furnacemen are reluctant to sell, not exactly from a selfish motive, but rather because they believe that the price of Foundry Iron must decline before another year's business is done, the present situation being out of line with a conservative policy in the conduct of the coming season's business. The demand all the while is for more Bessemer Pig, but the furnaces have none to sell. Some of the consumers are willing to pay liberal premiums, but even this inducement does not bring out any material to speak of. The same situation applies to Basic Pig Iron, and the dealers here are not counting on any more sales of importance this year nor do they look for any business immediately for the future. Under these circumstances no prices have been quoted.

Finished Material.—The Plate producers have been making large sales during the last week, and with the result that almost the entire output for the first quarter of next year has been sold up. This announcement, which came yesterday morning, was surprising. It has been known all along that a few sales were being made past January, but it was never apparent that the selling had been on such a large scale as to take up the first quarter's supply. The producers are now issuing a warning to the consumers that if they wish to get any material for the first quarter it would be wise to get under cover. During the week a local concern took 10,000 tons of Plates for delivery the first quarter of next year. The sale of ship material has gone on steadily, including with it some Plates for hulls. The American Ship Building Company have recently taken orders for 20 new ships, all of which are to be built the latter part of this year and the first of next, or as soon as the material can be had. This is increasing the interest in the Plate trade, and is, perhaps, responsible for the warning to the general consumers as issued by the Steel mills. Some of the mills came on the market during the past week and offered some material for delivery during the third quarter of this year, and the supply for the last quarter will be considerably increased. Yet this one mill will not be able to afford any appreciable relief for the general situation. The sales both for the present and for the future delivery are all made on the association base of 1.70c. The report comes now that most all of the Bar Iron mills have been closed down for a couple of weeks to permit repairs to be made. This will not necessarily complicate the situation much, since few, if any, of the mills are behind on their orders, or at least to such an extent as that reached by other mills, the Bar Steel mills for instance. The nominal quotation of Bar Iron is 1.80c., but very little selling is being done on that basis. The Bar Steel mills are not shut down, and are hardly able to meet the requirements, especially on the large rounds which continue to be scarce. The prices in the main are stable at 1.60c., Pittsburgh, for Bessemer, and 1.70c. for Open Hearth Steel Bars, but some premiums are asked and obtained on certain sizes which are scarce. The situation in the Sheet Steel trade continues to show a weakness which many producers do not like. Some of the smaller mills are very much disposed to make sales of material at less than the price which has heretofore been quoted, and this tendency is likely to drag some of the larger mills into the same state. However, there is a contention on the part of the larger mills against a reduction, and should the demand increase it is possible that a general slump might be avoided. In any other event, however, a general reduction seems almost inevitable. The market still shows the following quotations to prevail: For No. 10, as a basis on the gauges between Nos. 10 and 16, 2.50c.; and for No. 27, as a basis on the gauges between Nos. 17 and 28, 3.50c. to 3.60c. The demand for Structural Steel continues, both for immediate shipment and for delivery past the first quarter of next year. The tonnage is steadily increasing, and it now seems apparent that in a short time the entire production for the first half of next year will be covered, as it is approaching that point rapidly. The prices do not change from 1.70c. All demands for material for immediate shipment are met with the statement that there is no Structural Steel for sale for this year, the smaller mills recently offering material having withdrawn from the market.

Old Material.—The market this week has shown an upward tendency in prices. This, however, is more due to the desire of the dealers to increase their profits than arising from any large demand on the part of the mills and foundries for the Scrap. While this tendency is perfectly apparent it has had no effect upon the prices so far and the market is stable. The prices which have heretofore been quoted are therefore continued. They are: No. 1 Wrought, $19.50, net; Iron Rails, $27.50, gross; Iron Axles, $26, net; Cast Borings, $10, gross; Wrought Turnings, $15.25, gross; Cast Scrap, $16, gross; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

St. Louis.

CHEMICAL BUILDING, July 9, 1902.—(*By Telegraph.*)

Pig Iron.—The market conditions are very little different since our last report, and the volume of demand and inquiry continues on light scale. The continued scarcity of offerings influences a higher range of values, and the matter of price depends largely upon the urgency of the demands of the buyer. It is said a number of concerns using Iron and having more than enough on hand for immediate needs have turned sellers and have taken advantage of the present high range of prices. This accounts to some extent for some remarkably high figures. The combined difficulties that are now being encountered by the furnaces of a short Coke supply and slow handling of shipments by the railroads makes a hard problem for all hands concerned, and it is a matter of serious annoyance and hard labor for the sales managers to satisfy the calls of their trade. The following is the range of prices current for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$21.50 to $23.50
Southern, No. 2 Foundry	20.75 to 22.75
Southern, No. 3 Foundry	20.25 to 22.25
Southern, No. 4 Foundry	.... to 19.00
No. 1 Soft	21.25 to 23.25
No. 2 Soft	20.75 to 22.75
Gray Forge	19.75 to 21.75
Southern Car Wheel Iron	.... to 24.00
Malleable Bessemer	.... to 23.00
Ohio Silvery, 8 per cent. Silicon	.... to 22.00
Ohio Strong Softener, No. 1	.... to 23.00
Ohio Strong Softener, No. 2	.... to 22.00

Bars.—The jobbing trade are handling a very fair volume of orders for Iron and Steel Bars, and conditions in this department of the market are referred to in a very hopeful way. We quote from the mills: Iron Bars at 1.90c., Steel Bars at 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c., Steel Bars at 2.25c., full extras.

Rail and Track Supplies.—Conditions continue along the same lines, and while new demands are continually coming in the market, the mills are very much crowded in order to properly attend to the requirements of earlier contracts. We quote Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spikes, 2.50c. to 2.60c.

Angles and Channels.—The jobbing trade report a very fair demand for Small Angles and Channels. In the matter of the price-list we can note no change. For materials of this class 2.50c., base, continues to be the quotation.

Sheets.—The jobbing trade are carrying a very satisfactory demand for Sheets of all grades and sizes, and in the matter of the price-list it continues on a firm basis.

Pig Lead.—The continuance of the dull conditions in the market for Pig Lead is the only feature to be noted, and in the matter of price the last quotation will stand. Chemical at 3.97½c. and Desilverized at 4c.

Spelter.—The condition of activity noted in our last report has continued in the market for Spelter, and prices have mounted to a higher range. The bid for futures is now said to be 4.90c. to 4.95c.

Cincinnati.

FIFTH AND MAIN STS., July 9, 1902.—(*By Telegraph.*)

The general interest at this writing appears to center in the question of the miners' strike in the Southern district. Some of the Southern furnaces are having considerable trouble outside of the strike to make deliveries, and the prospect of further delays is very disheartening to both buying and selling interests here. The general situation is not materially changed within the week, except that there is a better understanding about prices for Southern brands. The amount of Foundry Iron for this year's delivery continues to be very small, and if it was not for some urgent calls for Iron the tonnage offered would be considered insignificant. In the present pinch, however, even a carload of No. 1 or 2 Foundry Iron is not deemed insignificant. Some sellers appear to hold to the idea that Iron is worth up to $20, Birmingham basis, for No. 2 Foundry and others say they have been selling in a small way at $19 for this year's delivery. Others take the view that the continued selling for next year on the basis of $16.50 to $17 for same grade sets a status for this year's offerings at $18 to $18.50. Sales of some 4000 tons of Gray

Forge and No. 4 Foundry on the basis of $17, Birmingham, this year's delivery, are reported. This is the output of some furnaces which had been running low grade contrary to expectations. One large Southern interest still continues to sell freely for next year on the basis of $16.50, Birmingham, for No. 2. Some other furnaces are holding to $17, same basis, and are booking some orders at that figure. Northern Coke Irons are very scarce and quotably higher. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, for 1902 delivery as follows, this year's delivery:

Southern Coke, No. 1	$21.25 to $22.25
Southern Coke, No. 2	20.75 to 21.75
Southern Coke, No. 3	20.25 to 21.25
Southern Coke, No. 4	19.75 to 20.75
Southern Coke, No. 1 Soft	21.25 to 22.25
Southern Coke, No. 2 Soft	20.75 to 21.75
Southern Coke, Gray Forge	19.75 to 20.75
Southern Coke, Mottled	19.75 to 20.75
Ohio Silvery, No. 1	24.60 to 25.10
Ohio Silvery, No. 2	24.10 to 24.60
Lake Superior Coke, No. 1	25.10 to 25.60
Lake Superior Coke, No. 2	24.60 to 25.10
Lake Superior Coke, No. 3	24.10 to 24.60
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel, chilling grades	$27.00 to $27.50
Standard Southern Car Wheel, No. 2	26.50 to 27.00
Lake Superior Car Wheel and Malleable	25.00 to 26.00

Quotations for first six months of 1903, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$19.75 to $20.25
Southern Coke, No. 2	19.25 to 19.75
Southern Coke, No. 3	18.75 to 19.25
Southern Coke, No. 4	18.25 to 18.75
Southern Coke, Gray Forge	18.25 to 18.75
Southern Coke, Mottled	18.25 to 18.75
Southern Coke, No. 1 Soft	19.75 to 20.25
Southern Coke, No. 2 Soft	19.25 to 19.75

Plates and Bars.—The market is reported as fairly active, and price firmly maintained. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.90c. to 2c., with half extras; same, in small lots, 2.20c., with full extras; Steel Bars in carload lots, 1.72c., with half extras; same, in small lots, 2.20c., with full extras; Angles, 2.30c. to 2.50c.; Plates, 3-16 inch and heavier, 2c.

Birmingham.

BIRMINGHAM, ALA., July 7, 1902.

The satisfactory settlement of the Coal miners' strike has been the absorbing question the past week, for upon its happy determination depended the course of the market. Both sides entered upon their arguments in a kindly feeling and differences were gradually lopped off until at the final conference on Saturday the scale for the ensuing year was adopted. It is as has been outlined in these letters and in telegrams to *The Iron Age* practically the same as prevailed for the year just ended. There are a few modifications of the old scale, but they are not of material importance, and concern mainly the day labor employees who get an increase in wages. The maximum price for mining Coal remains unchanged at 55c. per ton. The two weeks' pay day was lost, as were a few other contentions for which the miners strove. At the scale agreed on a provident, steady miner can earn $125 per month. Individual miners who have earned it inform your correspondent that they do it without extra effort. There are others who don't earn that amount or anything like it, but the fault is in the man and not the wages paid. The action of the conference will infuse new life into the Iron trade. It is a dominant factor in the continuous prosperity of this district. A prolonged strike in which ugly feeling predominated would have seriously retarded our advancement. There is no doubt that a feeling is prevalent among the wage earners that wages should be advanced. It is a natural feeling to the majority of those whose daily bread is earned by the sweat of their brows or the taxation of their brains. At this writing the four leading machine shops here are experiencing this truth, as demands have been made by the machinists of the Birmingham Machine & Foundry Company, the Hardie-Tynes Company, the Linn Iron Works and the machine shop of the Steel mill at Ensley for an increase to 35c. per hour, a nine-hour day and other minor demands. There was concert of action among the machinists as the same date and hour were given to each firm in which to sign the scale or suffer from a walk out. Some of the contentions of the machinists the employers have always fought, and if they are conceded now it will be with great reluctance and because necessity forces. About 90 machinists walked out Saturday morning to await developments. The employers considered, but did not sign scale at the time notice to each was given that its acceptance must be signed. One of the difficulties in the way of dealing with this move is lack of united action. One great trouble in these things is that employer and employee don't get close together. For instance, one Coal operator who is credited with fine profits from his mines declares that his profits in the last busy year was only 9.6 per cent. on the investment. Another declared that his mining profits were absorbed by improvements, &c. To these others could be added of similar tenor. Now the miners had a notion that these mines were tub mills of profit.

It has been an open secret here for some time past that negotiations were being conducted for the sale of the furnaces at Oxmoor, of which the Tennessee Company are the owners. The other parties to the deal were T. T. Hillman and his associates. The actual sale has been announced in other trade publications; but it was premature. Your correspondent has been told by authority that no such sale has been made. It is true that negotiations are pending, the success of which remains to be determined. Beyond this there is nothing to be said.

As to the market the past week, circumstances did not favor activity. Sellers were reluctant to price until indications pointed to the end of the Coal miners' strike. There were transactions of a limited character. Some spot and nearby delivery Iron went at $18 and $18.50, and to regular customers of the selling interest the basis being, as usual, No. 2 Foundry. There was some inquiry for 1903 delivery, sellers buying the first quarter in delivery. Price obtained is reported on basis of $16.50 for No. 2 Foundry. Some was sold on basis of $17 for No. 2 Foundry, say 1500 tons. The market closed firm and steady, and with a well defined feeling that it would be bad policy to put prices for 1903 to a point that would let in foreign Iron. There will be more disposition now that the wage scale is settled to feed the demand for 1903, and we may look for increased sales for that delivery and on the probable basis of $16 to $16.50 for No. 2 Foundry.

The Birmingham and Suburban Water Works Company are engaged on the preliminaries for the laying of pipe at Birmingham, Avondale, Woodlawn, Elyton and West End. It will take 25 miles of Pipe to inaugurate the enterprise, and the completion of their plans will require 60 miles of Pipe. They have purchased the Pratt City Water Works, which they assert will be greatly enlarged. The expenditure of $1,500,000 will be required. Just now the problem that worries them most is getting the Pipe. They must take their turn at waiting.

The Sanitary Sewer Committee have finally agreed upon a price to be paid for the building of the great sanitary sewer which, commencing at East Lake and ending beyond Bessemer, covers 14 miles of work and secures sanitary drainage for Birmingham and outlying suburbs. The cost will be $300,000. Step by step we are traveling the progressive road to the terminal of success. The road is a long one, and it is the only one that reaches the goal. The way is plain and the walking is good—and we are in marching order.

(*By Telegraph.*)

BIRMINGHAM, ALA., July 9, 1902.—The delegates to the miners' convention adjourned yesterday, after a two days' session, until Thursday, referring to the various camps for final action the conditions on which no agreement was made. The operators conceded an increase in wages of day labor, but strongly oppose a two weeks' pay day. The miners as strongly insist upon its adoption. Everything so far looks favorable to the adoption of the scale wage this week and the resumption of operations. The cost in wages to the miners from the suspension of work will so far foot up $300,000. The loss to the operators is proportionately great. Both sides are anxious for a mutually satisfactory scale. The end is in sight.

Pittsburgh.

(*By Telegraph.*)

PARK BUILDING, July 9, 1902.

Pig Iron.—Hot weather and short supply of Coke are combining to keep down output of Pig Iron and immediate supply is shorter than ever. Many of the Valley furnaces are not getting out more than half their usual product, and until the Coke situation gets better the present scarcity of metal will continue. There is a good deal of buying of Foundry Iron and sales are being made for delivery into first half of next year. Forge is also in fair demand and the market is firm at about $21, Pittsburgh. No large lots of Bessemer have been sold in the past week and there is little to be had. We quote Bessemer Iron for shipment in July, August and September at $20.50 to $21, at furnace. For shipment in last quarter and first quarter of next year about $20 at furnace might be done. Gray Forge is $21 and No. 2 Foundry $21.50 to $22, Pittsburgh.

Steel.—The Steel market is quiet and prices are showing an easier tendency. Many of the Sheet, Tin Plate, Wire and Wire Nail mills are closed, and consumption of Steel has fallen off a good deal on this account. It is also true that a good deal of Open Hearth capacity is coming on the market, and some parties who bought foreign Steel and are closed down are trying to resell it. All this has had the effect of easing the market, and more Steel is being offered than for a long time. We quote domestic Billets at about $31.50 to $32, Pittsburgh. Foreign Billets and Sheet Bars are being offered at about $31.75, Pittsburgh. It is possible that on a firm offer very close to $31, Pittsburgh, could be done for a large lot of Steel.

(*By Mail.*)

It is more than probable that the project of some of the merchant blast furnaces in the Youngstown district, together with local capital, to build a Bessemer Steel plant at Youngstown, will go through. The new venture has ample financial backing, and Warner Arms, formerly of American Sheet Steel Company, has been offered the presidency of the new concern, but has not yet decided to accept. The new plant, if built, will have a capacity of about 2000 tons of Bessemer Steel per day, and the product will be sold to mills that do not have their own sources of supply. The Iron market has been exceedingly quiet in the past week, possibly due to some extent to the two holidays on Friday and Saturday. At the same time it is true that demands for some lines of Finished Iron and Steel, notably Tin Plate, Sheets and Bars, has fallen off very much, and a good many mills that roll these products are idle for either want of orders or for necessary repairs and stock taking. It is said that stocks of Sheets are very heavy, and the tone of the market is weak. The shut down of so many Finishing mills, together with a number of Rod, Wire and Wire Nail mills, has caused a large falling off in consumption of Steel, and prices on the latter are lower than for some time, and the tone of the market is weak. While some apprehension is felt in the trade as to the outlook, yet at the same time it is pointed out that demand for Iron and Steel products always falls off in the summer months, and that this year is no exception. Pig Iron continues extremely firm, and a shortage in car supply, which is getting worse, prevents the furnaces from getting Coke as fast as needed, with the result that output of Pig Iron is very much restricted, and the situation as regards supply is getting more serious right along. It is predicted there will be a shortage of Pig Iron up until the close of the year, and that this will prevent any serious decline in prices. If this proves true it should go a great ways in sustaining prices on Finished Iron and Steel. It is the general opinion that July and August will be quiet months in the Iron trade, but that there will be no material decline in prices, as the mills have so many old contracts on hand, which will take some months yet to complete.

Rods.—While Rods continue scarce, it is also true the demand has fallen off a good deal recently on account of shut down of so many Wire and Nail mills. We quote Bessemer Rods at $36, at mill, but it is possible on a firm offer this price might be shaded.

Rails.—The Pennsylvania Railroad have come in the market and placed orders last week for 207,000 tons of Rails for 1903 delivery. About 120,000 tons went to constituent mills of the United States Steel Corporation and the balance was divided between Pennsylvania, Cambria and Lackawanna. We can also state that the Northern Pacific have placed an order for 40,000 tons and Rock Island for about 30,000 tons. In all it is said about 900,000 tons of Rails have been placed for next year delivery. We quote at $28, at mill.

Muck Bar.—The market is quieter than it has been for some time, a good many mills that use Muck Bar being closed for inventory and repairs and are out of the market as buyers. We quote best grades of Muck Bar at $36 to $36.50, Pittsburgh, but on a firm offer for large tonnage these prices might be shaded.

Ferromanganese.—The market is somewhat quiet, the large consumers of Ferro having covered their requirements for this year and well into next year, when prices were $3 to $4 a ton lower than they are now. We quote German Ferro at $52 and English at $53, in carloads and larger lots, Pittsburgh. No domestic is being offered.

Plates.—No special change to note in the situation. Demand continues heavy and mills that can ship within two to three months after receipt of order can get from 1.75c. to 1.85c. and higher for Plates. These prices correctly represent the market, as the official price of 1.60c. is only available where the buyer does not want delivery until last quarter of this year or into next year. Official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Structural Material.—Among jobs placed this week was the power house for the Philadelphia Company, about 1200 tons. A great deal of work is being given out and there is a large inquiry for next year. Prompt Beams and Channels continue to bring from 2c. to 3c. a lb., depending on tonnage and deliveries wanted. Official prices are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh. Mills and dealers who can make reasonably prompt deliveries have no trouble in getting 2½c. to 3c. per lb. for Shapes.

Hoops and Bands.—No change to note in the market. Demand is fair and prices are firm. We quote Hoops at 1.90c. for 250-ton lots and over, and 2c. in carloads. Bands are 1.60c. for Bessemer stock, 12 gauge and heavier, while for Open Hearth stock $2 per ton advance is charged.

Sheets.—The Sheet market is quiet, except for the heavier gauges, for which there is a good demand and on which the mills are a good deal behind on orders. A good many Sheet mills are closed, some for repairs and stock taking and others on account of slack demand. No. 27 Black Sheets, box annealed, one pass through cold rolls, are 2.90c., and No. 28 3c. For small lots from store jobbers charge from 10c. to 15c. per 100 lbs. advance. Galvanized Sheets are dull in demand. We quote at 70, 10, 5 and 2½ per cent. in carloads, while small lots bring 70 and 5 off. The above prices are f.o.b. at mill.

Bars.—Demand for Iron and Steel Bars is only fair and is mostly for small lots. The large consumers are covered by old contracts and specifications on these are coming in quite freely. It is claimed the recent weakness in prices of Iron Bars has almost entirely disappeared. We quote Steel Bars at 1.60c., half extras, for carload and larger lots, while small lots bring 1.70c. to 1.75c. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.74½c., Pittsburgh, extras as per National Bar Iron Card.

Skelp.—The market is somewhat quiet. We quote Grooved Iron Skelp at 2.10c. to 2.15c. and Sheared at 2.15c. to 2.25c. Grooved Steel Skelp is 2.25c. for ordinary tonnage and specifications, but on a large contract this price might be slightly shaded.

Merchant Steel.—The Shafting Association is to meet at Lake George, N. Y., on Wednesday, July 9, but it is not anticipated there will be any change in prices. We quote Tire Steel at 2.25c. to 2.30c.; Sleigh Shoe, 2.25c. to 2.30c.; Open Hearth Spring, 2.50c. to 2.60c., and Toe Calk, 2.35c. to 2.45c. All these prices are for carloads and are f.o.b. at mill. Crucible Tool Steel is quoted at 6½c. to 8c. and 9c. for ordinary grades, at mill. Shafting is 50 per cent. off in carloads and 45 per cent. in less than carloads, delivered in basing territory.

Merchant Pipe.—A fair amount of tonnage is being placed, but the market is without special feature. Discounts in carloads are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ⅓ inch, inclusive	60	48
¼ to 12 inch, inclusive	67	55

Boiler Tubes.—A good deal of tonnage is being placed, and the tone of the market is firm. Discounts in carload lots are as follows:

Boiler Tubes.	Up to 22 feet. Per cent.
Steel.	
1 to 1½ inch, inclusive	45
2¾ inch to 5 inch, inclusive	62½
1¾ inch to 2½ inch, and 6 inch to 13 inch, inclusive	52½
Iron.	
1 to 1½ inch, inclusive	42½
2¾ inch to 5 inch, inclusive	50
1¾ inch to 2½ inch and 6 inch to 13 inch, inclusive	40

Connellsville Coke.—A continued scarcity of cars exists in the Connellsville region, and shipments of Coke are very much retarded. Output of Coke in the Connellsville region last week, according to the *Courier*, was a little less than 250,000 tons. Furnace Coke on contracts is $2.25, and 72-hour Foundry from $2.75 to $3 a ton. Furnace Coke for prompt shipment brings from $3 to $3.50 a ton.

Scrap.—The Scrap market has been quiet in the past week, but prices are very firm, and some kinds of Scrap are scarce. We quote Heavy Melting Stock at $22.50 to $23 in gross tons. No. 1 Railroad Wrought Scrap, $22, net tons; Cast Scrap, $19 to $19.50, net tons; Car Wheels, $21, gross tons; Wrought Turnings, $14, net tons; Cast Iron Borings, $11.50 to $11.75 in gross tons; Old Iron Rails, $27 to $27.50 in gross tons.

In the month of June the Baltimore & Ohio Railroad hauled from Fairport 230,098 tons of ore, most of it going to the furnaces in the Pittsburgh District. This is the largest tonnage for a single month ever hauled from that port by the above named road.

At Pittsburgh, the Pittsburgh Coal Company and the Monongahela River Consolidated Coal & Coke Company have advanced the price of coal 1 cent per bushel.

New York.

NEW YORK, July 9, 1902.

Pig Iron.—There has been no material change in the Pig Iron situation. The situation in the Lehigh Valley continues exceedingly unsatisfactory, while better reports come from Virginia. The latest telegrams from Birmingham indicate that the coal miners' strike in that district will be settled to-morrow. It is difficult to quote American Pig Irons for nearby delivery, and the following figures are nominal: Northern Iron, at tidewater, No. 1 X, $23.50 to $25; No. 2 X, $22.75 to $23.50; No. 2 Plain, $22.25 to $22.50. Tennessee and Alabama brands are quoted as follows: No. 1 Foundry, $22.50 to $23.50; No. 2 Foundry, $21.75 to $22.50; No. 3 Foundry, $21.25 to $21.75.

Steel Rails.—The placing of the Pennsylvania order is regarded as important, because it is generally the signal for a large number of smaller roads to take up the question of providing for their requirements. It is understood that the Carnegie Steel Company have received 100,000 tons, and the Cambria and Pennsylvania companies each 37,500 tons. The Lackawanna Company received an order from the Pennsylvania Railroad some weeks ago. It is understood that only a part of the New England and the Southern business has been closed, but that the Coal roads are all provided for. Reports are current of some pretty low offers of both German and English Steel Rails by importers. We continue to quote $28, at Eastern mill, for Standard Sections.

Finished Iron and Steel.—An additional number of large buildings for this city has been placed, and the amount of work coming up is very heavy. It is stated that there are projects to the number of 37 under consideration for the erection of tall buildings in the stretch on Seventh avenue between Forty-fifth street and Fifty-ninth street in this city. We quote at tidewater as follows, but must add that for small lots and for prompt delivery much higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c.; Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.05c.

Iron and Industrial Stocks.

During the broken week the volume of business in the stock markets has naturally been light. Colorado Fuel & Iron Company furnished a sensation on Tuesday by a sudden drop from 94 to 90⅜, from which it recovered somewhat. Cambria has continued its advance under a relatively heavy business on Monday and Tuesday, crossing 26 on the latter day. Otis Elevator has made new records by passing 34 for the common and reaching 105 for the preferred stock. United States Steel issues are dragging along and do not seem to command much attention from the investing public. Contrary to published reports, it is possible that a decision in the injunction against the conversion plan may be announced at an early date.

International Steam Pump Company.—The annual report of the International Steam Pump Company for the year ended March 31 shows the following income account:

Balance undivided profits last year		$1,962,350
Interest		21,802
Total		$1,984,152
Dividends: Com., International Pump	$490,500	
H. R. Worthington	184	
		490,684
Balance last year's surplus		$1,493,468
Net profits for year		$1,510,486
Less preferred dividends:		
International Steam Pump	$531,000	
H. R. Worthington	140,000	
Provision for debentures, interest, preferred dividend and expenses, Blake & Knowles Steam Pump, Limited (unpaid)	105,050	
		776,050
Surplus		$734,436
Previous surplus		1,493,468
Total undivided profits		$2,227,904

President Dunn, in his annual statement, says: "The manufacturing plants of the company have been taxed to their utmost to meet the increased demand. The orders on hand at the present time are largely in excess of the capacity of the works. During the year just closed the orders taken have been over 41 per cent. in excess of the orders taken during the preceding year. The unfilled orders at the end of the present fiscal year amount to $5,750,000, which is $3,500,000 in excess of the unfilled orders on March 31, 1901. It has been found necessary to substantially enlarge the plants. Additions have been made to some of the shops, and the erection of extensive new works has been begun at Harrison, N. J., for the Worthington Company, which will largely increase the present capacity of the Worthington plant. It is intended that the new works shall be the largest and best equipped pump manufacturing plant in the world. There has been purchased during the past year the Clayton Air Compressor Works, which has proved an important acquisition to the properties of the company. The outstanding 40 per cent. of stock of the Holly Company, except a small number of shares, has also been acquired in the process of reorganizing the affairs of the company. On May 20, 1901, the International Association of Machinists inaugurated a strike which practically shut down the principal shops of the company for upward of three months, and in view of the effect of this strike upon the past year's profits the result is highly satisfactory."

Dividends.—The American Tube Stamping Company have paid a dividend of 1¾ per cent. on the preferred stock.

The Empire Iron & Steel Company have paid a dividend of 1½ per cent. on the preferred stock.

The New York Machinery Market.

NEW YORK, July 9, 1902.

Since our last writing a short, quiet week has passed. Business was quiet, but no more so than is usually the case at the beginning of the summer lull. Large machinery merchants assert that the rush to get in before the advanced prices was not nearly as great as was expected. The stiffening tendency of the market has not been checked as yet and we hear of several additional advances in prices. It is said that almost all of the planer builders have now advanced their prices approximately 5 per cent. On larger sizes the increase in price is above that figure. There is talk of possible action by the builders of upright drill presses. We have heard of no fixed advance in this line as yet.

While it is possible that some little additional equipment will be required at the New York Navy Yard for the building of the 16,000-ton armored cruiser which Secretary Moody has consigned to that yard, it is not probable that the amount will be very large. The fine new shop of the Bureau of Steam Engineering has not as yet had a chance to show itself to advantage. This opportunity will now be afforded.

An important matter which has attracted the attention of the trade is the decision of the J. L. Mott Iron Works to establish a plant at Trenton, N. J. John Reid, the general manager of the concern, informs us that the company already have in operation at Trenton a plant for the production of sanitary earthen ware. This plant stands on a plot of 12 acres which the company have owned for some time. They have now purchased 12 acres in addition and propose to eventually move their entire plant from Mott Haven, N. Y., to Trenton. The work is not to be rushed, however. As yet no plans whatever have been prepared, despite the press reports which state the dimensions of the proposed buildings. It is intended to erect the finest plant of the kind in existence, and with this end in view the details will be carefully worked out. Henry Van Atta, the company's mechanical engineer, will supervise the preparation of the plans. The Mott Haven plant will be moved gradually to Trenton. As it is now equipped with modern machinery it is probable that the purchase of new machinery will not foot up as heavily as is generally expected. The new plant is to represent a total outlay of $1,000,000.

An excellent plant passed out of existence last week when the works of the Capewell Horsenail Company of Hartford, Conn., were destroyed by fire. The loss, we are informed, amounted to $250,000. There was a good sized equipment of modern machine tools, but the greater portion was special machinery.

A rumor, started by press reports, has been going the rounds in the street to the effect that the Louisville & Nashville Railroad intend building a $1,000,000 system of shops at Louisville, Ky. We have been unable to verify the report as yet. P. P. Huston is the purchasing agent, with offices at Louisville.

The Hendey Machine Company of Torrington, Conn., inform us that they intend adding to their plant. Several good sized additions have been built to this plant of late. The latest one is to be 63 x 130 feet, three stories high. It is expected to have the new shop in readiness by November 1. Upward of 450 men are now employed by the company. The officers are H. J. Hendey, president; F. F. Fuessenich, treasurer, and C. H. Alvord, secretary.

It was reported in the trade that the specifications for the New York & Port Chester Company's power station are ready. We are informed that only a preliminary lay out has been made and that the work on the actual specifications has but just begun. It will be several months before the matter is ready for bidders. C. O. Mailloux of 76 William street, New York, who, with W. C. Gottshall, is designing the power station, stated that about 20,000 horse-power will be required. The New York & Port Chester Company were incorporated in New York April 3, 1901, to build a four-track electric road from a connection with the Rapid Transit Railway at 132d street, New York, to Port Chester, a distance of 21 miles. No contracts for the work have been awarded as yet.

The date for the opening of bids for the equipment of a complete pumping station to be built at Baldwins, L. I., by the city of New York has been changed from July 10 to July 24. J. Hampton Dougherty is Commissioner of Water Supply, Gas and Electricity, with offices at 13-21 Park row, New York.

The Stirling Company were awarded the contract for the new boilers to be installed by the General Electric Company at Schenectady. The order calls for 4200 horse-power. The boilers are to be provided with superheaters and are to be operated in connection with the steam turbine plant to be installed by the company.

The boiler order for the power station of the Washington & Annapolis Electric Railroad Company has been placed with the Stirling Company. The contract calls for 2500 horse-power and was awarded by the Cleveland Construction Company of Akron, Ohio, who are to build the road and equip it.

Another contract has been placed for the extension of the Waterside Station of the New York Edison Company. It was a duplicate order for coal and ashes handling machinery, and was awarded to the Exeter Machine Works of 120 Liberty street, New York. There has been some comment in the trade over the fact that no additional boiler orders have been placed in connection with the extension of this plant. The fact of the matter is that the present extension simply means the bringing of the plant up to the capacity originally intended. When the first orders were placed boilers were contracted for right up to the full capacity of the plant as ultimately intended. This order called for 56 boilers, aggregating about 37,000 horse-power. It was awarded to Thayer & Co. of 39-41 Cortlandt street. They have just received a notification to send on "16 more boilers."

C. B. Coles & Sons Company of Camden, N. J., who have contracted with Hooven, Owens & Rentschler of 39 Cortlandt street, for a 200 horse-power engine, will require additional wood working machinery.

McClave, Hamilton & Co. of 85 Liberty street have been retained as contractors and engineers by George C. Batcheller of Bridgeport, Conn., who will install an entire new electric power station and increase the mechanical equipment of his plant. He is a corset manufacturer.

Charles H. Paine of 85 Liberty street has obtained an order from the Edison Electric Illuminating Company of Brooklyn for Wainwright even flow auxiliary feed water heaters, to be added to the Bay Ridge Station, which now has a capacity of about 18,000 horse-power. The heaters will be built by the Taunton Locomotive Mfg. Company of Taunton, Mass.

The Exeter Machine Works received an order from W. J. Haskins for the entire mechanical equipment for a $25,000 coal pocket, to be erected at Thirty-second street and East River by Lowtha Bros.

The E. W. Irwin Machinery & Supply Company of 114 Liberty street have been appointed sole sales agents for the Atlantic Coast States and the United States navy yards by the Philadelphia Pneumatic Tool Company.

Information Wanted.—Who produces knotting machines for knotting furniture springs?

The Tin Plate Scale.—No agreement was arrived at by the representatives of the American Tin Plate Company and the Amalgamated Association, who met in New York last week, for the purpose of considering the foot notes included in the wage scale for 1902-1903. The Amalgamated men wanted time to consider the scale offered by the company and suggested an adjournment. The conference will be resumed at a later date, which has not yet been decided. In the meantime the men will continue at work, in compliance with their agreement of last April, which provides that in case of the failure of immediate decision regarding the 1902-1903 schedule they continue at work for the balance of 1902. The new scale, if agreed upon, will, however, take effect beginning July 1 of this year. The American tin plate officials present were: Warner Leeds, first vice-president, and District Managers J. R. Phillips, William Banfield, Cecil A. Robinson and Berthold Goldsmith. The base of the scale has already been fixed and the present controversy is only regarding the foot notes as printed in *The Iron Age* under the date of June 26.

Edward Muench, purchasing agent of the American Bridge Company and just elected to be president of the new company for Pottsville, died on July 5 at his home at Overbrook, Philadelphia, from typhoid fever contracted while on a business trip in Cuba. Mr. Muench was born at Millersburg, Pa., 30 years ago.

Pig Iron Capacity Very Large.

In spite of the blowing out and banking of a number of blast furnaces in the East, in Virginia and in the Ohio Valley, the active capacity with which we entered the second half of the year is as large as it has ever been. This is due to the fact that a number of large plants, notably in the Central West, have resumed after the short strike of the furnacemen in the valleys.

The weekly capacity of the furnaces in blast on July 1 compares as follows with that of the preceding periods:

	Total capacity per week. Gross tons.	Coke capacity per week.	Charcoal capacity per week.
July 1, 1902	352,590	344,950	7,640
June 1	344,748	337,492	7,256
May 1	352,064	345,627	6,437
April 1	337,424	331,140	6,284
March 1	323,028	316,039	6,989
February 1	332,045	325,440	6,605
January 1	298,460	291,992	6,468
December 1, 1901	324,761	317,358	7,403
November 1	320,824	313,775	7,049
October 1	307,982	300,538	7,444
September 1	299,861	293,256	6,605
August 1	303,847	297,269	6,578
July 1	310,950	303,793	7,157
June 1	314,505	306,991	7,514
May 1	301,125	293,915	7,210
April 1	296,676	288,766	7,910
March 1	292,899	284,825	8,074
February 1	278,258	278,258	8,335
January 1	250,351	243,254	7,097
December 1, 1900	228,846	222,067	6,779
November 1	215,304	207,381	7,923
October 1	223,169	214,921	8,248
September 1	231,778	223,551	8,227
August 1	244,426	236,131	8,295
July 1	283,413	274,921	8,492
June 1	296,376	288,771	7,605
May 1	293,850	286,956	6,894
April 1	289,482	281,644	7,838
March 1	292,643	285,596	7,047

The status of the anthracite and coke furnaces was as follows on July 1:

Coke and Anthracite Furnaces in Blast, July 1.

Location of furnaces.	Total number of stacks.	July 1. Number in blast.	July 1. Capacity per week.	June 1. Number in blast.	June 1. Capacity per week.
New York	14	7	7,623	6	6,041
New Jersey	6	4	3,983	4	3,957
Spiegel	3	2	293	3	482
Pennsylvania:					
Lehigh Valley	28	15	9,901	20	12,038
Spiegel	1	1	92	1	128
Schuylkill Valley	14	12	9,483	13	10,820
Low. Susquehanna	10	7	5,728	6	5,715
Lebanon Valley	12	8	6,127	10	7,247
Pittsburgh Dist.	34	32	82,359	33	82,076
Spiegel	..	..	....	..	....
Shenango Valley	18	16	23,792	13	21,995
Western Penn.	21	17	19,569	16	20,186
Spiegel	1	1	675	0	0
Maryland	5	4	5,653	4	6,050
Wheeling Dist.	10	10	16,375	10	15,782
Ohio:					
Mahoning Valley	15	14	27,697	10	20,929
Cent. and North.	14	14	26,212	14	25,702
Hocking Valley	3	2	607	2	881
Hanging Rock	13	7	4,648	10	5,975
Illinois	18	18	34,970	16	32,281
Spiegel	1	1	933	1	905
Minnesota	1	..	....	..	....
Wisconsin	5	5	4,318	5	5,373
Missouri	1	1	836	1	722
Colorado	3	3	4,400	3	4,395
The South:					
Virginia	23	15	10,769	18	11,006
Kentucky	8	6	2,602	5	2,057
Alabama	40	29	26,929	31	26,855
Tennessee	16	14	8,376	13	7,894
Georgia	1	..	....	..	....
North Carolina	1	..	....	..	....
Totals	356	265	344,950	268	337,492

There were blown out or banked during June one Henry Clay, in the Schuylkill Valley; one Allentown Rolling Mill, Crumwold; one Crane, one Lock Ridge and one Saucon, in the Lehigh Valley, and Soho, in Pittsburgh. In the Shenango Valley production suffered dur-

ing the early part of June, on account of the strike, so that it was about 17,000 tons less than the normal. In the Lebanon Valley one Bird Coleman and one Sheridan was blown out. Virginia suffered from the coke strike. Allegheny, Shenandoah and Princess being idle. Pulaski and Max Meadows lost 17 days, but were running on the 1st. In Kentucky Grand Rivers was out for three weeks. The Hanging Rock region also suffered from the West Virginia coal miners' troubles, Belfont being blown out for repairs on the 21st ult., Hamilton losing 17 days, Union being banked for two weeks, while both Willston furnaces were banked on the 1st. In the Mahoning Valley one of the Hubbard stacks was idle. In Alabama there were banked or blown out on the 1st one Alice, one Bessemer and one Ensley of the Tennessee Company.

There were blown in during June Cedar Point, in New York; Atlanta and Hall, in the Shenango Valley; Rockhill and Nittany, in Western Pennsylvania; Vesta, in the Lower Susquehanna Valley; Radford-Crane, in Virginia; the second Watts, in Kentucky; Lawrence, in the Hanging Rock region; Calumet and one South Chicago, in Illinois; Hannah and Haselton of the Republic Iron & Steel Company, and Tod, in the Mahoning Valley, and Rockdale, in Tennessee.

The production of pig iron, month for month, since the beginning of the year and for the first six months has been as follows:

Monthly Production of Anthracite and Coke Pig Iron During the First Quarter.—Gross Tons.

	January, 1902.	February, 1902.	March, 1902.
New York	31,357	28,726	31,609
New Jersey	16,144	13,263	19,860
Schuylkill Valley	35,618	36,826	39,009
Lehigh Valley	50,164	40,216	41,690
Susquehanna and Lebanon	57,611	47,311	46,963
Pittsburgh	357,326	317,522	351,841
Shenango	108,513	89,014	102,551
Western Pennsylvania	85,151	69,948	83,856
Maryland, Virginia, Kentucky	68,340	66,882	79,947
Wheeling District	59,807	45,304	50,136
Central and Northern Ohio	81,663	69,133	83,214
Mahoning Valley	142,067	118,723	145,511
Hanging Rock, Hocking Valley	32,463	29,171	32,127
Illinois, Wisconsin, Missouri and Colorado	160,386	163,402	199,635
Alabama	110,103	95,673	115,929
Tennessee	30,960	27,396	31,137
Total coke pig	1,437,673	1,257,610	1,445,015
Production charcoal pig	28,969	28,207	27,836

Estimated Production of Pig Iron for the Second Quarter and for the First Six Months of 1902.—Gross Tons.

	April, 1902.	May, 1902.	June, 1902.	First six months, 1902.
New York	29,802	23,895	30,927	176,316
New Jersey	19,593	19,358	18,327	106,545
Schuylkill Valley	40,153	42,161	45,726	239,493
Lehigh Valley	51,943	58,486	45,603	288,102
Susquehanna and Lebanon	58,126	58,286	53,198	321,495
Pittsburgh district	350,421	361,343	355,821	2,094,274
Shenango Valley	105,933	116,273	84,194	606,478
Western Pennsylvania	83,220	89,395	86,761	497,431
Maryland, Virginia and Kentucky	83,728	81,005	76,608	456,510
Wheeling district	63,821	69,890	70,178	359,136
Central and Northern Ohio	96,576	113,822	112,353	556,761
Mahoning Valley	121,324	128,445	99,789	755,859
Hanging Rock and Hocking Valley	31,045	31,856	23,297	179,959
Illinois, Wisconsin, Missouri and Colorado	198,436	196,734	189,449	1,108,042
Alabama	114,355	118,922	119,414	674,396
Tennessee	26,979	32,960	35,099	184,531
Total coke and anthracite	1,475,455	1,542,831	1,446,744	8,615,328
Total charcoal pig	27,871	29,142	32,712	174,737
Grand total	.....	.....	1,479,456	8,790,065

The notable features in the above figures are the falling off in the production of the Lehigh, Shenango and Mahoning valleys and in the Hocking Valley. There was some decline in the production of Virginia also. Still, when the fact is considered that June had 30 days the production was only about 14,000 tons less than that of the rate reached in May.

The status of the charcoal furnaces was as follows:

Charcoal Furnaces in Blast July 1, 1902.

	July 1.			June 1.	
Location of furnaces.	Total number of stacks.	No. in blast.	Capacity per week.	No. in blast.	Capacity per week.
New England	7	3	182	4	195
New York	3	2	652	3	705
Pennsylvania	5	3	136	3	154
Maryland	1	1	103	1	140
Virginia	3	2	74	0	0
Ohio	9	2	141	2	70
Kentucky	3	0	0	0	0
Tennessee	1	0	0	1	69
Georgia	4	2	718	2	676
Alabama	4	3	1,199	3	1,109
Michigan, Missouri and Wisconsin	10	8	4,334	8	4,038
Washington	1	1	100	1	100
Texas	4	0	0	0	0
Totals	55	27	7,640	28	7,256

Furnace Stocks.

The position of furnace stocks, sold and unsold, as reported to us, was as below on July 1, as compared with the five preceding months, the same furnaces being represented as in former months. This does not include the holdings of the steel works producing their own iron:

Stocks.					
Anthracite and Coke	Feb. 1. 121,762	Mar. 1. 96,315	Apr. 1. 69,974	May 1. 63,583	June 1. 57,231	July 1. 61,312
Charcoal	32,438	29,030	23,289	20,276	15,977	13,725
Totals	154,200	125,348	93,263	83,859	73,208	75,037

The sharp decline in the stocks of charcoal iron is noticeable.

OBITUARY.

ALEXANDER W. ADAIR of the firm of W. P. Snyder & Co., at Pittsburgh, and also secretary of the Shenango Furnace Company, at Sharpsville, Pa., met with a very sad death on the evening of July 4. Mr. Adair was spending the evening with Mr. Snyder, who was his uncle, at his summer home on Sewickley Heights, and was setting off fireworks. He had lighted a large bomb, which he thought had gone out, and was stooping down to relight it when it went off, mutilating his face terribly and causing his death next morning. Mr. Adair will be missed by his friends in the iron and steel business at Pittsburgh, with whom he has had pleasant relations for some years. Mr. Snyder has lost a valuable assistant and one whom it will be hard to replace. A particularly sad feature of the death of Mr. Adair is that his father sailed for Europe last week and will not know of his son's death until he reaches the other side.

JAMES STEWART, founder of the engineering and contracting firm of James Stewart & Co., St. Louis, Mo., died on July 6 at Pittsburgh, Pa., aged 80 years. He was born at Peterhead, Scotland, and in 1843 removed to Kingston, Canada, where he established an architectural and building business. Mr. Stewart remained in Canada for 22 years, and held for six years the position of Building Commissioner under the Dominion Government. He removed to St. Louis in 1865, and formed a partnership in the engineering and contracting business with his son, Alexander M. Stewart, under the style of James Stewart & Co. Fifteen years ago he retired from active business.

DYER WILLIAMS died in Chicago, June 24, aged 76 years. He was a prominent railroad man and the invertor of a car coupler, perfected in 1895, and which has been extensively used. He also invented a mower and reaper. In the early part of his life he was master mechanic of the New York Central Railroad for a good many years and later rebuilt the road running between Cayugo Lake and Utica, of which he was superintendent. Mr. Williams traveled extensively in Europe in the interest of his mower and reaper, which was largely used in Germany, Denmark and Sweden.

MARCUS A. HANAN, a manufacturer of dies and patterns in New York City for many years, died on July 5 at his home in Brooklyn, aged 77 years. He was born in Castlebar, Ireland, but came to this country over half a century ago.

Engine Requirements for the Parallel Operation of Alternators.*

In connection with extensive work in electrical engineering, the Westinghouse Electric & Mfg. Company have from time to time been called upon to give information and suggestions regarding engine requirements for the parallel operation of engine type or direct connected alternators. This information has been crystallized into the form of a specification, which is often embodied in the contract for generators or sent to the engine builders for their information or assistance. The specification is entitled "Engine Requirements for the Parallel Operation of Engine Type or Direct Coupled Alternators and for Engine Type Alternators Driving Rotary Converters." The engines driving the alternators should have the following characteristics:

Four Characteristics of Engines.

a. The engine governors should be so constructed that there is no tendency to cause a periodic transfer or surging of the load between one engine and another. This tendency may originate in the angular variation of velocity in different parts of the revolution which is common to all reciprocating engines, or to a sudden variation of load which will affect each governor in a slightly different manner, or to other causes that lead to a nonuniform speed. The engine governors should not be sensitive to such disturbances nor maintain or increase them. The effect on the engines of a periodic transfer of load, occasioned by hunting between two engines running in parallel, is somewhat similar in effect to throwing the load on and off of a single engine at short equal intervals, which may be measured by one or several pulsations in the combined turning efforts applied to the engine shaft. In some extreme conditions the pulsations of load may amount to more than the normal capacity of either engine. With no external load one engine may then alternately drive the other, which will evidently be a more severe condition than if the load were only applied and removed from a single engine. If under any case of pulsating load the engines do not tend to accentuate the pulsations in turning effort and speed, then a condition favorable to parallel running is attained.

b. Variation of the rotating part of the generator through the revolution at any constant load, not exceeding 25 per cent. Overload should not exceed one-sixtieth of the pitch angle between two consecutive poles from the position it would have if the motion were absolutely uniform at the same mean velocity. The maximum allowable variation, which is the amount the rotating part forges ahead plus the amount which it lags behind the position of uniform rotation, is therefore one-thirtieth of the pitch angle between the two poles. Generally this is obtained by the use of a heavy fly wheel. In a two-pole machine this variation is equivalent to 3 degrees as measured on the circumference of the rotating part; in a four-pole machine it is 1½ degrees, and in a six-pole machine 1 degree, or as the number of poles increases the permissible angular variation decreases.

c. The engines should have practically the same characteristics of speed regulation, that the power delivered to their respective generators may be porportional to the load—that is, the same load on any engine should produce the same percentage drop in its speed. This is most readily obtained in engines in which at full load the speed drops from 3 to 5 per cent. below the no load speed, as a slight change in adjustment of the governors will have less relative effect than in engines in which the speed drops only 1 per cent. under the same variation of load.

d. The use of governors which are adjustable while the engine is running is recommended. Slight adjustments of speed may then be made, which will facilitate synchronizing the alternators or changing the load carried by the engines.

Maximum Permissible Variation on Either Side of Uniform Rotation.

Poles.	Angular degrees.	Per cent. of circumference
2	3.000	0.83333 1-3
4	1.500	0.41666
6	1.000	0.27777
8	0.750	0.20833
12	0.500	0.13888
16	0.375	0.1041
20	0.300	0.0833
24	0.250	0.0693
28	0.214	0.0594
32	0.187	0.0520
36	0.167	0.0462
40	0.150	0.0416
44	0.136	0.0378
48	0.125	0.0347
52	0.115	0.0320
56	0.107	0.0297
60	0.100	0.0278
64	0.094	0.0260
68	0.088	0.0245
72	0.083	0.0231
76	0.079	0.0219
80	0.075	0.0208

It may be noted that there is no attempt to tell how these results are to be obtained. This is a problem for the engine builders.

Paragraph *a* deals principally with the engine governors as the source of most of the difficulties. The alternators simply transform mechanical energy and electrical energy and their effect in connecting engines together is precisely the same as any other elastic coupling, and as far as the engines are concerned should be considered as such. The force tending to keep the generators in step is sometimes termed the synchronizing power. It is sometimes contended that this force should be made stronger or weaker to accommodate assumed engine conditions, but this cannot be done without extensive changes in the generators. To make the force weaker reduces the inherent voltage regulation of the generators, and to make it stronger adds considerably to their cost.

Effects of Pumping.

Some of the effects of pumping may be reviewed by considering the simplest case in which pumping occurs—namely, when two alternators are in parallel with no external load. If the alternators will work in parallel under this condition they will usually work together under load or with one or more additional units. This is also the usual condition of starting. Either generator and engine alone on an external load may perform in a perfectly satisfactory manner. Before connecting the generators together they should be brought exactly in step or in the same phase and as nearly as possible to the same speed, as indicated by synchronizing lamps or synchroscope. When the two generators are connected together at precisely the proper instant nothing unusual will happen for a few seconds, but soon the ammeters will show cross currents between the alternators as pumping commences, indicating that the generators are no longer in the same phase, or there is an angular difference between the machines which did not exist at the moment of synchronizing. If the ammeters are very sensitive they will show that the cross currents pass to zero at each pulsation. If they are "dead beat," as most switchboard instruments are now made, they will indicate a steady flow of current with perhaps small pulsations.

A sensitive wattmeter will also indicate that energy flows from one generator to the other, or one unit acts alternately as motor and generator to the other. The voltage on the two machines is lowered by these cross currents and is pulsating and therefore is unsuitable for lighting service. Synchronous motors and rotary converters connected to these generators may pump, drop out of step, or otherwise cause trouble. The generators may also grow warm on account of these cross currents or give out sounds indicating unusual internal mechanical forces. If the pumping increases in severity, fuses may blow, circuit breakers open, or the generators finally pump entirely out of step. The engines meanwhile may perhaps not show that anything unusual is happening, while the pumping continues, leading some to

* Paper read by E. M. Tingley of the Westinghouse Machine Company, Pittsburgh, Pa., before the Engine Builders' Association of the United States, at Pittsburgh, May 22, 1902.

assume that the trouble is all in the generators, while it is only the result that is apparent and not the cause.

If, however, as in some cases, it is possible by looking through the arms of the fly wheels to see the change in relative angular position of the two machines, it will be seen that there is an actual vibration between the two machines, such as might be expected to occur with an elastic coupling between the engines. These disturbances are usually traceable to the engine governor, since if they are not maintained by some regular recurring change in steam distribution they would soon die out on account of frictional resistances to such oscillation.

If the case is considered where a load is thrown on and off a single engine and generator by a suitable switch at regular recurring intervals, the governor may lag in its correcting effect and then again overshoot the mark in maintaining an average speed. If this periodical load is applied or removed at the instant the governor and engine begin to recover from one of these excessive speed corrections the effect is maintained or it is cumulative and the engine varies periodically in speed. Now if this intermittent load is replaced by another engine and generator there may be a resonant action between the governors on the one hand and the synchronizing force between the generators and inertia of the rotating parts on the other, which will produce the same action on the governors as the intermittent load.

The oscillations may be started either by the angular variation in speed which occurs in all reciprocating engines or by changes of load. Usually additional fly wheel effect in the rotating parts decreases the tendency to pumping. It is only when additional fly wheel capacity increases this resonant effect that the additional fly wheel is objectionable. In place of one or more generators rotary converters or synchronous motors may be substituted and the effect will be the same as far as the generators are concerned.

To assist the engines in parallel running it is now usual to apply dampers to the poles of the generators and rotary converters and synchronous motors. Dampers do not insure parallel running, nor are they absolutely necessary, as is shown from experience. The best and most effective form of damper may not reduce pumping to a reasonable amount in some cases, and in other cases parallel operation is accomplished practically without dampers.

In continuing our mechanical analogy, if the generators in connecting the engines are similar to an elastic coupling, then the dampers are similar in action to a dash pot in reducing the yield of that coupling to varying forces. Where the best form of dampers are ineffective in reducing pumping to an allowable amount it means that the impulses from the engines are greater than can be corrected in the generators. The steam distribution, inertia of reciprocating parts, and the effect of gravity on the reciprocating parts in vertical engines all contribute to the varying angular velocity.

Limiting the Cross Currents.

Paragraph *b* limits the angular variation from uniform velocity solely to limit the cross currents between generators and rotary converters to what is considered a reasonable amount. If the angular variation is no larger than specified the performance will be satisfactory. The angular variation is usually calculated from the variations in crank effort and the fly wheel capacity of rotating parts, since its correct measurement is exceedingly difficult. The objection may be raised that the allowable angular variation is exceedingly small, especially on machines with a large number of poles. However, other authorities have given a value one-sixth smaller than that which we have adopted.

Engines running with cranks in step will give better performance as regards themselves than with cranks out of step, especially if the angular variation is large, since the angular difference between two generators may be at all times smaller than the difference from absolutely uniform rotation. With a large angular variation, however, the operation of rotary converters will be unsatisfactory. With the engine cranks out of step there may be larger cross currents between the generators, but the fluctuation frequently in the outside circuit will be smaller than before, since it will be the resultant action of two or more engines.

In some cases the angular variation may be such that while parallel operation is possible, rotary converters or synchronous motors are inoperative or unsatisfactory.

Dividing the Load Between Two or More Engines.

Paragraph *c* refers to governor characteristics by which the load is properly divided between two or more engines. The same precautions would be observed if the engines were carrying the load together by means of a belt or other drive, instead of by means of electrical generators. What is really desired is that each engine shall at all times exert its share of the total driving effort or torque, a condition which is so readily obtained in water wheels. It is absolutely necessary to proper division of the load in parallel running. Of course, it is most readily seen that in engines in which this speed variation from no load to full load is from 3 to 5 per cent., instead of 1 per cent., this condition is most easily obtained. If this constant torque characteristic cannot be obtained by a suitably designed governor it may be possible to obtain it through some auxiliary devices.

Recommendation of Adjustable Governors.

Adjustable governors are recommended in paragraph *d* for the purpose of transferring the load from one generator to the other in order that the load may be readily cared for at the switchboard, or reduced so that the generator switches may be opened without injurious arcing. Usually the engine governors will vary in their own adjustment and it becomes necessary to correct this from time to time in order to divide the load properly, since all the governors may not regulate the same throughout the total range of load. Adjustable governors also enable an unloaded engine to be synchronized with a loaded engine.

The parallel operation of alternators driven by water wheels has been uniformly successful and the same should be true of engine driven alternators. Success, however, has been the rule, and by suitable governors and ample fly wheel capacity there is no doubt but that in all cases in which parallel running is required it may be accomplished.

PERSONAL.

Fritz Grimm, one of the engineers of the Schalker Huetten v. Gruben Verein of Gelsenkirchen, Westphalia, is now in this country.

Col. Henry G. Prout, editor of the *Railroad Gazette*, has received the degree of Master of Arts from Yale College.

John Pender of John Pender & Co., manufacturers of horseshoe nails, Brunswick, Victoria, Australia, is making a business trip across the continent. He arrived in San Francisco from Melbourne May 31. He expects to remain in this country between two and three months.

John Hays Hammond has accepted an appointment as a professor at the Sheffield Scientific School, Yale College. He will be in charge of the practical part of the course in mining engineering.

E. G. Spilsbury, consulting engineer, of New York, who has been in Europe for some time conducting important negotiations, returned home last week.

The municipality of St. Andrew's, Scotland, will bestow the freedom of that city on Andrew Carnegie on July 18.

Jos. E. Schwab of the United States Steel Corporation, New York, has returned from a trip to Europe.

It is stated that the Standard Oil Company will build in England a fleet of 12 steamships, of 40,000 barrels capacity each.

Metal Market.

NEW YORK, July 9, 1902.

An interruption of business from the 3d to the 7th inst. occurred, owing to the holiday, and the closing of the Metal Exchange and most metal houses between these dates. Since the resumption of business trade has been extremely dull in all branches, due doubtless to a large extent to the closing down of mills for repairs.

Pig Tin.—The market fluctuated very little, and demand from consuming interests was slight. Arrivals thus far this month amount to 717 tons, and afloats aggregate 2683 tons. It is predicted that arrivals th.: month will be rather light, unless the large shipments made arrive with unsuual promptness. It is expected that the steamer sailing from London this week will bring quite a heavy cargo. Toward the close of this month and the beginning of next four direct steamers from the Straits will be due here, and they may bring close to 2000 tons. The closing quotations to-day shared a shade stronger than last week. Spot was quoted 28.25c. to 28.50c. Futures are as follows: July, 28c. to 28.37½c.; August, 27.60c. to 28c.; September, 27.25c. to 27.75c.; October, 27c. to 27.50c. London closing cables named £126 15s. for spot, and £124 10s. for futures.

Copper.—The market is dull, with prices in buyer's favor. Yesterday Lake was obtainable at 12.15c. and Electrolytic was sold to the extent of 100,000 lbs. at 11.95c. for this month's delivery. Closing prices to-day were as follows for spot to October delivery: Lake, 11.95c. to 12.15c.; Electrolytic, 11.95c. to 12.05c.; Casting, 11.75c. to 11.95c.; Standard, 11.37½c. to 11.75c. The London market closed £52 17s. 6d. for spot and £53 5s. for futures. Best Selected declined 10 shillings for the week to £57 10s. Exports thus far this month have been very light, amounting to about 1800 tons. A further decline, as compared with last month, is expected this month. In London the premium on futures has gone up to 7 shillings 6 pence, which shows that spot there is plentiful. Business is very small there, however, as illustrated by the fact that on Monday and Tuesday not a ton of spot was traded in.

Pig Lead.—London has advanced 2 shillings 6 pence above last week, but here the situation is unchanged. The Smelting & Refining Company quote 4.12½c. for Desilverized, strictly spot, and 4.10c. for 15 days, New York. The London market closed to-day £11 6s. 3d.

Spelter.—The firmness of the market both here and in St. Louis continues. The New York price is unchanged at 5.12½c., but St. Louis has advanced 10 points to 4.95c. London advanced 5s. to £19.

Antimony—Is unchanged. Hallett's is quoted at 8.37½c., and Cookson's remains unchanged at 10.25c.

Nickel—Is unchanged; ton lots are quoted at 50c.

Quicksilver.—Prices are on a basis of $48 per flask of 76½ lbs. in lots of 50 flasks or more.

Tin Plates.—The market is unchanged. The American Tin Plate Company are quoting for delivery until October 1 on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or $4 f.o.b. Pittsburgh. Quotations from Swansea show a decline of 1½d. to 13s. 4½d.

The Boston Machinery Market.

BOSTON, MASS., July 3, 1902.—The local dealers in new machinery report the customary summer dullness in business, but there is little disposition to complain thereat. On the contrary, a very cheerful and optimistic feeling seems to prevail. The dealers in second-hand machinery say that business continues lively with them, in spite of the advent of the summer months.

The recently adjourned Massachusetts Legislature rejected the petition for authority to grant degrees in engineering, presented by the Boston Engineering School, Incorporated.

The New York & Berkshire Street Railway Company were incorporated by an act of the Legislature. They are capitalized at $600,000, and have authority to build an electric railway between the Connecticut River and the New York State line, in Southwestern Massachusetts, provided they have a portion of their road in operation within three years.

The Legislature passed to engrossment a bill compelling every manufacturing company in the State to pay their employees in lawful money of the United States, but the Senate killed it at its enactment stage. It is supposed that this legislation was aimed at the American Steel & Wire Company, who pay their Worcester employees by check, and are the only large corporation in the State who settle with their workmen in that manner.

Ex-Attorney General Hosea M. Knowlton, Charles G. Washburn and Frederick J. Stimson have been appointed as a committee to examine the State laws in relation to the formation, taxation and conduct of all foreign or domestic corporations, except municipal, banking and public service corporations. The committee is to compare the corporation laws and their effect upon trade, commerce and manufactures with the corresponding laws and their effect, in other States and countries, especially in reference to taxation, and it is to consider whether the corporation laws of other States or countries are more favorable to the growth of trade, commerce and manufactures, and is to determine upon what legislation is necessary to make the relations between the State and the corporations more advantageous to the Commonwealth and to the public interest. The committee was appointed by Governor Crane, and it has announced its readiness to receive suggestions in reference to the matters submitted to its consideration. There has been much complaint regarding the State's corporation laws, and it is conceded that many corporations have been driven to other States for their charters, while some have been led to leave the State altogether. It is hoped that this Committee on Corporation Laws may find a way to attract organizing companies to the State.

The J. D. Jewett Company have been incorporated under Massachusetts laws. They will deal in builders' and general hardware and electrical supplies. They are a close corporation with $30,000 capital, and they succeed J. D. Jewett & Co. at 168 Washington street and 11 Devonshire street, Boston. Joseph D. Jewett is president, Walter C. Vaughan, formerly of J. D. Jewett & Co., is secretary, and Howard E. Whiting, recently Superintendent of Parks in Cambridge, Mass., is treasurer.

The Congress Street Associates are to erect a new building 125 feet high at the corner of Congress street and Exchange place, Boston. The building is to have a steel frame, and will cost $1,000,000. It will contain 300 offices, each 15 x 21 feet. Andrews, Jacques & Rantoul, 1 Somerset street, are the architects, and they will call for bids some time before July 15. The building is to contain elevators and heating, lighting and ventilating plants.

The School House Commissioners of Boston have awarded the contract for eight new boilers for the English High School Building to the Roberts Iron Works of Cambridge, Mass., who offered to furnish them for $4075. The other bidders were: Hodge Boiler Works, $4114; Cunningham Iron Works, $4670, and Edward Kendall & Son, $4700.

The McLean Mfg. Company, organized under the laws of the State of Maine, have elected the following officers: President, James McLean of Boston; vice-president, Thomas Killaran of Boston; secretary and treasurer, H. A. Quinn of Woburn, Mass.; directors, the above and Frank E. Hawkes and Alex. McLean of Boston. The company have a capital of $200,000 and they were organized for the purpose of carrying on a general manufacturing and machinists' business, especially the manufacture of a patent horseshoe devised by James McLean. They will be located in Boston. James McLean is a machinist in business at 82 Sudbury street.

June Fluctuations in Iron Stocks.

The following sales show the fluctuations in the quotations of the stocks of the iron and steel companies:

Cap'l issued.		Sales.	Highest.	June.	Lowest.	June.
$10,000,000	Am. Bicycle Co., com.	13,700	7½	21	6¼	30
20,000,000	Am. Bicycle Co., pref.	3,800	23¾	18	21	30
10,000,000	Am. Bicycle Co.,bonds.	40,300	67¾	23	65	5
29,000,000	Am. Car & F'dry, com.	114,300	33⅜	17	30¾	5
29,000,000	Am. Car & F'dry, pref.	4,000	91½	23	90½	9
	Am. Locomotive, pref.	8,250	95	30	92	7
15,000,000	Bethlehem Steel.....	....	..	..	..	..
45,000,000	Cambria Steel.....	7,850	26⅝	16	23¼	9
17,000,000	Col. Fuel & Iron.....	198,400	101½	11	85	27
24,410,900	Crucible Steel, com...	....	..	..	..	..
24,399,500	Crucible Steel, pref..	....	..	..	..	..
1,975,000	Diamond St. Steel....	1,400	1¾	16	1¼	13
15,000,000	Inter. Pump, com....	5,250	54½	17	53	11
8,850,000	Inter. Pump, pref....	1,000	93½	16	89	6
11,000,000	Inter. Silver.....	8,100	14⅝	24	11½	23
10,750,000	Pa., new, com., Phil..	....	..	..	..	..
16,500,000	Pa., new, pref., Phil..	2,100	90¾	2	90	28
12,500,000	Pressed Steel, com...	19,200	49¾	2	45½	24
12,500,000	Pressed Steel, pref...	3,600	87	13	85⅛	26
27,191,000	Rep. Iron & St., com.	11,200	18¼	12	17	25
20,306,900	Rep. Iron & St., pref.	10,400	75⅝	14	72¾	27
7,500,000	Sloss-Shef. S. & I.,com.	300	33	26	32	19
6,700,000	Sloss-Shef. S. & I.,pref.	400	82	12	81	6
20,000,000	Tenn. Coal & Iron....	28,200	65	2	61½	24
1,500,000	Tidewater Steel.....	3,325	7	18	5¼	6
510,361,300	U. S. Steel Co., com..	148,400	40¼	2	36¾	19
508,511,200	U. S. Steel Co., pref..	169,300	90⅜	2	87½	19
1,500,000	Warwick I. & S.....	7,200	7	26	5	4

The Cambria Steel Company.—CHICAGO, ILL., July 9, 1902.—(*By Telegraph.*)—The Cambria Steel Company announce that the 134-inch plate mill which they are building will be started in September. This will be the largest active plate mill in the country. The Cambria Steel Company have just received an order for 800 all steel hopper coal cars for Cornelius Vanderbilt, Jr. The cars were designed and patented by Mr. Vanderbilt.

HARDWARE.

There is a movement which is constantly gaining in strength and spreading over a wide area for the localization of the wholesale Hardware trade. Jobbers who formerly enjoyed a remunerative business from routes 300, 400, and in some instances even 600 or 800, miles from their base are finding their profits cut down to a point where such routes are no longer paying ones, and are either abandoning them or carrying the business without profit in the hope of a turn in the tide. The day is apparently approaching when St. Louis jobbers will not send their salesmen into New York and Pennsylvania, when Cleveland's territory will not extend from Albany to Fargo, and when Chicago jobbers will find little trade east of Indiana. It was doubtless a recognition of this tendency to localize the jobbing business that recently made the dream of a giant consolidation with a chain of depots attractive to many wholesale Hardware merchants.

There are constant reminders that the jobbers' field is moving steadily westward. In the East the large Hardware jobbing houses are few and the largest are unknown, the importance of the wholesale merchant growing as one travels West until at the Pacific Coast he is of paramount importance to the retailer. As the center of population moves westward, as the means for rapid and easy communication multiply and the wealth and influence of Hardware merchants in cities of medium size increase, the need for a jobber's services grows less and his importance diminishes. In Pennsylvania, New York, Ohio, Indiana, Illinois, Michigan, Iowa and in many of the thriving cities of the South large retailers have reached a point where they find it both possible and profitable to supply their smaller neighbors with goods, and each new jobbing business thus begun creates a new trade center and lessens the flow of orders to the great jobber at a distance.

It is not necessary to refer here to the various influences which have conspired to bring about this result, but there is little doubt that in more than one way the absence of a close personal relationship has much to do with it. This is seen even in the matter of credits, which has so important a bearing on the favor in which the purchaser of goods holds the seller. The jobbers' credit man is almost necessarily doing his share to help on the movement in which the smaller merchants are drifting away. While the sales department is keeping its left hand informed as to all its right hand does, the credit man is drawing his lines closer and making things difficult for the little concerns who are not well rated. The manufacturers in the great combinations are shortening the time of payment and reducing, if they do not withdraw, cash discounts. To even up matters the jobber draws the lines closer, charging interest on overdue accounts, withdrawing credit when the indebtedness grows beyond a certain point—which is gradually lowered—and in various ways handling this end of the business with a certain cold abstraction which strongly resembles the banking spirit, and causes the Hardware dealer with limited means to welcome the advances of his wealthier neighbor, to whom he is personally known, who can appreciate his honest purpose to pay and considers his word as good as his bond, if not better.

When under the stimulus of influences for which the great jobber is in some measure responsible the larger and more enterprising retailer realizes that a more profitable field lies open before him, he prints the word "wholesale" in prominent letters upon his letter head, gets a limited line of jobbing discounts, and starts out to work up a clientele in his immediate neighborhood. In many instances he has earlier in his career had a road experience in the employ of a jobber; in others, the gossip of the salesmen visiting him, and his own observations have given him all the guidance he needs. His acquaintance with the local requirements are of value. His increase in expense is slight—possibly a porter or an extra clerk and an outside man—and this is more than counterbalanced by the lower prices he gets on many commodities as soon as his standing as a jobber is recognized. It is not long before he has a very respectable field with a trade with which he is upon the friendliest of terms. When he reaches the point where he sends another man or two upon the road there is still a strong personal element in his trade, which gains for him friends and patrons, and commercial relations without distrust or fear of harsh measures if ill luck intervenes.

There are many things which combine to make a small localized jobbing business successful: There is the intimate acquaintance with local needs and a stock adapted to satisfy them; there is the feeling of equality with his customers that influences friendship and makes connections lasting; there is the small expense in caring for the trade; there is the ability to supply goods quickly from stock with small freight bills, and, since the line is restricted, less liability of aggravating shortages in shipments; there is the increased profit in retail sales on goods bought at the manufacturers' wholesale prices, and there is a freedom from rule and precedent which makes it possible to sacrifice a sentiment or principle to please a purchaser. This last is a powerful factor, and in strong contrast to the conditions prevailing in the large wholesale Hardware establishment.

The evolution of the jobber from the retailer is a natural one. Almost all of the present jobbers conducted a retail business which was the foundation of their house and from which their wholesale business has been developed. This tendency will evidently continue, and as the towns multiply and means of communication increase, the business will be localized, until the conditions in New England will prevail the country over, modified only by the distance from manufacturing centers and the need of depots of supplies. The great jobber of the East has well nigh disappeared; the great jobber of the Middle and Southern States has probably passed the meridian of his greatness, and in the far West the same process will apparently go on developing what may be termed local jobbing houses. There will always be a Hardware jobbing business, but it will increasingly be in the hands of a larger number of houses with a restricted territory.

Condition of Trade.

Manufacturers and the jobbing trade agree in reporting a very satisfactory condition of things. The results of the business of the past six months are such as to encourage them in an enterprising prosecution of their interests, with, in many cases, increased facilities for the making and selling of goods. Much attention, as usual at this time, is being given to completing arrangements for the fall campaign, including such matters as the overhauling of plants, revising quotations, instructing travelers, general consideration of business methods and in various ways maturing plans for an active season. The vacation period and the effect of the summer months

naturally interfere a good deal with the activities of the trade, and the lull in the receipt of orders is not unwelcome. Manufacturers are looking for an opportunity to replenish their depleted stocks, but the indications point to an entrance on the fall business with a materially smaller supply of goods than for many years. The jobbers have for the most part covered their requirements for several months to come, and their orders are accordingly comparatively light, but still aggregate a very respectable amount. It is not found a difficult thing to sell goods in the present state of the market, and manufacturers do not find it necessary to make special efforts in this direction. The trade are, with few exceptions, buying freely to cover their needs for the fall, but while there is a hopeful and even sanguine feeling that business is to continue in large volume, there is a conservatism as to placing orders beyond what the trade is pretty sure to readily absorb. With a strong and confident market there is recognition by prudent and farseeing merchants and manufacturers that prices are abnormally high, and that when a reaction comes there must be a material shrinkage in values. In this way the market is restrained from an abnormal activity which might have injurious effects, and the caution thus exercised will doubtless have its influence in tending to postpone the time when the supply will exceed the demand and the effect of competition with greatly increased manufacturing facilities will subject the market to the test under which it is assumed that, in accordance with the laws of trade, it must give way. While opinions differ as to when this will happen there is a pretty general agreement in anticipating a continuation of existing favorable conditions during at least the fall trade.

Chicago.

(By Telegraph.)

The actual conditions of the Hardware trade have been somewhat obscured by the intervention of the National Independence holidays and the occurrence on Monday of the freight handlers' strike. There was quite an accumulation of mail and a number of orders were filled on Monday, but no shipments could be made because of the labor troubles at the railroads, none of which were exempt from the difficulty. On Tuesday, however, three railroads accepted most of the freight offered, and the prospects seem to be favorable for a bettering of conditions before the end of the week. At best, however, there is an unsettled feeling; yet with many of the traveling salesmen home for the holidays the amount of new business has been relatively small in general lines. The demand for Heavy Hardware, however, has continued conspicuously active, and with nearly all lines of iron and steel advancing the consumptive order trade is naturally stimulated. While the demand for Nails and Wire and such staple articles is now of summer proportions, there has been but little accumulation of stock in the hands of mills, and it now seems probable that few of the mills owned by the American Steel & Wire Company other than those making Bars will be closed for repairs, there being business enough on hand and in sight to keep them running continuously during the dull period. The crop outlook, too, since the opening of this month is reassuring and gives promise of a satisfactory business during the fall. It was about a year ago when the great activity in staple lines of Hardware began, and consequently comparison at the present time is made with an unusual period, and yet the present volume of business does not make a poor showing in comparison. Among the larger contracts for Builders' Hardware placed during the last ten days has been the First National Bank Building, amounting to about $18,000, and the Capitol Building, at St. Paul, Minn., amounting to about $12,000, both of which contracts were taken by Chicago firms. Few, if any, new features have been developed in lines of Shelf Hardware, and no changes of special moment have been made in prices, either by manufacturers or jobbers, in Tools or Specialties.

St. Louis.

(By Telegraph.)

This is the season of preparation for the larger demands of the fall buyers, and while the volume of business is of a quiet order now it is said to be satisfactory for this time of the year. Salesmen are active, and when orders do commence to come in the office and store forces look for a long period of great hustle and activity.

NOTES ON PRICES.

Wire Nails.—The output of Wire Nails has been reduced by the shutting down of mills for the annual repairs and clean up. Jobbers' stocks generally are light, and some complaint is heard of not receiving as prompt shipments from mill as is desirable under these conditions. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—Demand for Wire Nails from store has been light, owing to the interruption of the holidays during the week past. Quotations remain unchanged, as follows: Small lots from store, $2.30; carloads on dock, $2.18 to 2.20.

Chicago, by Telegraph.—There has been a moderate movement in Wire Nails from the mills and a fair demand for small amounts from store, the market ruling firm. Single carloads are quotable at $2.20, and small lots at $2.25 to $2.30 from store.

St. Louis, by Telegraph.—The quiet demand continues for Wire Nails, and in the matter of price we note no change, carload lots being $2.25, and small lots from stock $2.30.

Pittsburgh.—The market continues exceedingly quiet, orders being for small lots only. There is very little cutting in prices by the mills, this being done only in isolated cases. Quite a number of Wire Nail mills are closed, some for lack of orders and others for repairs and stock taking, and output of Wire Nails this month will be smaller than in any one month for some time. We quote Wire Nails at $2.05 in carloads, $2.10 in small lots. It is possible that on an attractive order for Wire Nails the carload price might be shaded a trifle.

Cut Nails.—The decrease in requirements for Cut Nails has enabled mills to make shipments more promptly. There seems to be considerable delay of Nails in transit, owing to lack of transportation facilities, which is annoying to the purchasers. Quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots	$2.05
Less than carload lots	2.10

New York.—Cut Nails, in the local market, are in light demand. Prices are unchanged at the following quotations, for carloads and less than carloads:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—There is a seasonable demand for Cut Nails and a steady market with prices unchanged at $2.30 for small lots from store.

St. Louis, by Telegraph.—Cut Nails continue in demand, and jobbers quote $2.40 for small lots from stock.

Pittsburgh.—The Cut Nail market is somewhat quiet, but prices are reasonably firm. Orders being placed are mostly for carloads or smaller lots. There is still a scarcity of Iron Cut Nails. We quote: $2.05, base, in carloads and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—There is a lack of activity in the Barb Wire market, resulting in a limited quantity of Wire

being shipped from the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carloads	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—The number of orders for Barb Wire being received are not only up to the average of this season but somewhat larger than usual. Galvanized sells at $3.10 and Painted at $2.80 in carload lots with 5 cents extra for small quantities.

St. Louis, by Telegraph.—The normal seasonable demand is to be noted for Barb Wire. In the matter of prices recent quotations rule: Painted at $2.90 and Galvanized at $3.20.

Pittsburgh.—New business in Barb Wire is light, and is mostly for small lots. There is more or less unevenness in prices, particularly among the jobbers, who sometimes quote lower than the mills. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—Some of the Plain Wire mills are accumulating stocks of Wire, owing to the restricted requirements of the season. Quotations are as follows, f.o.b. Pittsburgh, terms, 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra.
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—There has been a fair order demand for Plain Wire during the week, and the market has remained firm. Sales are made at $2.20 in jobbing lots from store.

St. Louis, by Telegraph.—The demand for Plain Wire is light, but conditions ruling are referred to as the usual order for this season of the year. Prices remain steady, and No. 9 is quoted at $2.25, and Galvanized at $2.65.

Pittsburgh.—New orders are very light, and the mills are running mostly on old contracts. The tone of the market is not as firm as it has been, and there are reports of some shading in prices. We quote Plain Wire at $2, and Galvanized at $2.40, in carloads, f.o.b. at mill.

Cast Iron Soil Pipe and Fittings.—Under date of July 1 the manufacturers of Cast Iron Soil Pipe and Fittings announced new prices to the jobbing trade. They also agreed between themselves that hereafter all sales at jobbers' prices are to be confined to the "blue list" of jobbers issued by the National Confederated Supply Associations, and that all sales to other persons or firms must be at prices adopted by the Association of Manufacturers. The new prices adopted at the Niagara Falls meeting show an advance of 5 per cent. over the prices in effect since April 1 last.

Malleable Iron Fittings.—Under date of July 1 the manufacturers of Malleable Iron Fittings withdrew prices and announced that an advance of 10 per cent. had taken place on that date. Recent changes in the wages of the workmen and a continued advance in the price of raw material are responsible for the change. It is said that all the principal manufacturers of Malleable Fittings are overwhelmed with orders.

Egg Openers.—The prices to the trade on Hartigan's Patent Egg Opener, made by Wm. R. Hartigan, Collinsville, Conn., are $2 per dozen for the nickel plated, and $4 per dozen for the silver plated.

Cordage.—The Rope market continues in much the same condition as at our last report. Considerable Rope is being distributed by the manufacturers, but the majority of orders are for comparatively small quantities. Quotations, according to maker, range from 9½ to 10 cents for Sisal, on a basis of 7-16-inch and larger; and from 12½ to 13 cents for Manila on the same basis, with ¼ cent rebate on both kind for large lots.

Glass.—An invitation has been sent out to all Window Glass manufacturers by President James A. Chambers of the American Window Glass Company to meet at Cleveland, Ohio, on July 10. The object of the meeting is to ascertain whether it is the desire of the manufacturers to work in harmony on the question of prices or not. It is understood that a proposition has been made by the owners of the new Glass blowing machine to the American Window Glass Company looking to the exclusive use of the machines in the American factories. No date has yet been set for a meeting between the American Window Glass Company and the National Window Glass Jobbers' Association to arrange the placing of an order for Glass by the latter. The demand in the East is small for Glass, while in the West it is much larger. The Jobbers' Association quotations are as follows for single and double strength:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

Paris Green.—Manufacturers of Paris Green report that there is no market and no price on the commodity, as the demand has become insignificant. There may be a revival of trade, but probably not to any great extent this season.

Paints and Colors.—*Leads.*—The demand for White Lead in Oil is not so large as for June, but a fair quantity is being consumed. Manufacturers are closing their works for the annual repairs, &c. It is reported that they have orders on hand for fall delivery which will not permit keeping the works closed as long as usual. Quotations are as follows: In lots of 500 pounds or over, 6 cents; in lots of less than 500 pounds, 6½ cents per pound.

Spirits Turpentine.—The Turpentine market has declined during the week under review, which has had the effect of stimulating buying. A stronger market at Savannah is reported, which may cause an advance in local prices again. Quotations at this point, according to quantity, are as follows: Southerns, 47½ to 48 cents; machine made barrels, 48 to 48½ cents per gallon.

KRUSE & BAHLMANN HARDWARE COMPANY.

THE KRUSE & BAHLMANN HARDWARE CO., Cincinnati, Ohio, have concluded negotiations for the site of their new Hardware manufacturing plant. The property was secured for $74,400 and the buildings will cost nearly $100,000 to construct. The site fronts on Sixth street, having a frontage of 285 feet. On Pioneer street it fronts 110 feet, with a depth from Sixth street to the latter street of 176 feet.

The new building will be five stories high and of mill construction. The building will be of pressed brick and will contain a floor space of 150,000 square feet, with a carrying capacity on each floor of 500 pounds to the square foot. The building will contain all the modern labor saving devices for handling goods. It will be heated by steam and an electric plant will form part of the equipment. The offices will be on the Pioneer street side of the building. Arrangements have been made with the Pennsylvania Railroad Company for the laying of a switch from the Eggleston avenue tracks into the premises and sufficiently long to contain four of the largest modern freight cars. The company expect to be in their new quarters by January 1, 1903.

Jobbers' Selling to Consumers.

WE have received several communications on this subject in which Hardware merchants refer to their experience in the matter. Many of them complain of the way in which their trade is interfered with, as sales are made by jobbers and sometimes by manufacturers to their customers. In the following letter the matter is referred to at some length, our correspondent narrating his experience and the way in which his trade has been interfered with:

X. Y. Z. (a well-known jobbing house) for many years had sold me the bulk of Shelf Hardware handled through my store, as well as a great many other goods. While enjoying this trade almost exclusively they allowed the same man who was soliciting my trade to underbid me on a bill of Nails I had given prices on to one of our customers, who were about to put up a plant. They were sold the goods at less than they asked me for them at the time. This traveler was not as diplomatic as they would have liked, so they sent another man to look after our factory trade. He has been coming for three or four years, two or three times a month. And by making a great many presents to the buyers of the various plants he has practically stolen away from the retail dealers all the trade in all kinds of Hardware that we carry in stock.

In the course of the controversy over this interference with our trade they have very magnanimously offered to give us a chance to duplicate any bills they have sold and they will give us a discount. We contend that they do wrong to come and solicit the trade, and as long as they do so we can get no orders, even if we agree to duplicate their bills, which we have offered to do.

The National Hardware Association stands for the principle that the local trade belongs to the local retail dealer. Indeed, the association, through its representative, at our State association, took the ground that the consumers should be supplied by the retail dealers. We do not ask for the trade in goods that enter into the manufacture of the product of any plant. The jobbing houses justify themselves in competing with the retail dealers for this trade, because they say all other jobbers do the same thing, if not here then elsewhere. I say it does not make a wrong right because many enter into it.

I think through our State and National associations, retail and wholesale, and through our trade papers such a pressure should be brought to bear upon the jobbers that they will be led to see it is not wisdom for them "to kill the goose that lays the golden egg"—namely, the retailer. If they go much further in their aggressions upon him he may as well lay down and die.

The Influence of the Associations.

It is evident that the retail Hardware associations in the different States have accomplished a good deal in the way of correcting this evil. Some of them refer to the influence of their organizations as being such that the jobbers are very ready to discontinue the practice when the matter is called to their attention. From several associations we have received advices which indicate that there is now comparatively little reason for complaint. The following advices from some of the prominent organizations are of interest in this connection:

From Minnesota.

We have had in Minnesota but few complaints of late in regard to jobbers selling to consumers. There was much more complaint before our association was formed. We find that a reasonable request to our jobbers by the secretary of our association, representing between 400 and 500 dealers, receives much more attention than anything an individual dealer could say.

We had an experience last year where one of our principal jobbers insisted on selling to a friend of his who runs a large farm, but our secretary convinced him that it was not advisable.

My experience is that a good, strong, live association can do more toward correcting such evils than any other method.

But there is one thing that association members should not forget—that they cannot expect jobbers to be loyal to them when they are not loyal to the jobbers by continuing to purchase from those who are unfavorable to the principles of our association.

There is no doubt that an alive retailers' association of 500 membership has a very salutary influence on the trade. When the large catalogue house of this territory went bump last year its list of creditors made very interesting reading to the retailers, and some amusing explanations followed. Conditions, however, have improved and at present there is little friction. The large jobbers in this section are very friendly, and if any little lapse occurs and attention is called, they do what they can to straighten matters.

From Ohio.

Our association passed a resolution in 1898 regarding the sale of Hardware by the manufacturer or jobber direct to the consumer, and we are still holding to our resolution. We always stand ready to protect our members by taking action against the offending manufacturer or jobber, and I am glad to say that in the State of Ohio we have had very, very little trouble of this nature. What we have had has, in the main, been settled satisfactorily to all parties concerned.

From Wisconsin.

I would say that I do not think there is much of the trouble alluded to in this State. Whether it is due to the work of the association, to the generally prosperous times, or the fairmindedness of the jobber, I am unable to say. Of this I am very sure, there is but little ground for complaint, and the few complaints I have had have been satisfactorily adjusted with a single exception, now in the mill.

From New England.

I think our associations have done much toward eliminating the practice of jobbers selling to consumers. While it is done to some extent, cases are somewhat rare and no doubt have conditions governing the transactions that may be called special. I do not think that the practice is at all general.

An Association Circular

In a circular received, issued by the Wisconsin Retail Hardware Association, touching upon a number of matters of trade interest, there is the following reference to the jobbers' interference with the retailers' trade:

"TIME WILL TELL." Some of the jobbers and manufacturers who are sailing along entirely ignoring the wishes of that natural channel for their goods—The Retail Dealers—may be on the high tide of success; but all we ask is that Mr. Retailer be patient and bide his time—for time will tell—"shor." Anybody can sell goods these times—it is merely a question of who can get them; but there was a time, Mr. Wholesaler, and there will be another, when you were knuckling to the Dealer for every bit of his trade you could get. Be patient, Mr. Dealer, and just remember "TIME WILL TELL."

The Retailer at Fault.

The letter which we print below is from an enterprising Hardware merchant in Indiana. It is of interest as indicating the methods that he pursues in carrying on his business, in which there is both a retail and a wholesale department. The point our correspondent makes, that the retail merchant is often to blame for

lack of enterprise in conducting his business and looking after the requirements of those who are or should be his customers, is deserving careful attention. There is little doubt that the neglect of retail merchants to cultivate trade which properly belongs to them leaves the door open for the jobbers, and gives them a tempting opportunity to sell goods which would not otherwise be afforded them:

Noting your article on selling of goods to consumers by the jobbers, we desire to relate our experience and suggest a remedy. We are jobbers of Shelf Hardware, Factory Supplies, Plumbers' Supplies and Heavy Hardware. Our traveling men call upon the Shelf Hardware retail dealers in our territory, but go to the consumer of Heavy Hardware, Plumbing Goods and Factory Supplies, for the reason that none of our retail customers handle these other lines. But even then some of the dealers object to our selling anything whatever to any one else in the same town or territory. Now we have some customers, and every jobber has customers, who do not keep a well assorted stock of goods, but who are opposed to the jobber selling anything whatever to the consumer. This, in our opinion, is unjust to both consumer and jobber.

We have a retail department to our store and find it the most profitable part of our business, because of the great variety of articles on sale on which there is but little competition. And just here is where the retailer makes his mistake, in not carrying a larger variety of goods, catering to the wants of his customers and having on hand what the consumer wants when he calls, who will not buy from the jobber or outside party if he can get the article that he wants at any time in his own town. We believe it is unjust to the retailer for the jobber to sell the same goods to both retailer and consumer, but see nothing wrong in selling both parties different lines, and especially if the retailer makes no effort at supplying the want of the consumer.

Some jobbers send one traveling salesman around with Shelf Hardware, &c., to the retailer only, and follow with another who sells the same goods to the consumer only. Such business is contemptible, and the jobber should be censured and lose all the trade of the retailer.

We would prefer to sell to only the retail trade, but it would mean the cutting out of over one-half the articles we carry, unless the retailers would carry them, which they do not now. There is blame on both sides of this question. Some jobbers are injudicious and over ambitious to sell goods, or are perhaps unscrupulous. Some retailers, on the other hand, lack ambition in any degree and are not in the least looking to the welfare of their customers, seemingly expecting the consumer to get along with what they have for sale or do without it.

CARNAHAN STAMPING & ENAMELING COMPANY.

CARNAHAN STAMPING & ENAMELING COMPANY, Canton, Ohio, are running their enamel department, which started up April 1, to its full capacity both night and day. Their new Servian ware, which is a distinct line and different from anything in the market, is proving a seller with the trade. The enamel in this ware is said to cling to the metal body with remarkable tenacity. The color is of a copper, or Tuscan red, with a fine gloss. The company, at the present time, have an output of about 15,000 pieces per day, and they are now at work increasing their facilities in order to give them four times their present output. The company, in addition to the can and enameling departments, also produce nearly a full line of Galvanized Ware.

The Hardware establishment of J. L. Thornton, Alexander City, Ala., has been destroyed by fire, with a loss of $8000, covered by insurance to the extent of $3000. Mr. Thornton has reopened with a new and complete stock.

TRADE ITEMS.

THE LOUIS HOFFMAN HARDWARE COMPANY, Vicksburg, Miss., at their annual meeting on June 28, re-elected their old officers, Louis Hoffman, president and treasurer, and Frank J. Hoffman, vice-president. A dividend of 8 per cent. was declared. Mr. Hoffman embarked in business in 1857, and the stock company were formed in 1886.

THE partnership heretofore existing between J. W. Foley and F. Johannigmann, under the firm name of J. W. Foley & Co., has been dissolved by mutual consent. Mr. Foley has retired and the business of manufacturing Grey Iron Castings will be continued by Frank Johannigmann at the old stand, 629 to 637 West Front street, Cincinnati, Ohio.

GRAY & DUDLEY HARDWARE COMPANY, Nashville, Tenn., held their annual meeting on the 16th ult. The regular semiannual dividend of 3½ per cent. was declared, and has been paid. The result of their past year's business was considerably better than expected, and they passed a comfortable sum to the credit of their surplus fund. The following directors were elected; John M. Gray, R. H. Dudley, R. M. Dudley, R. H. Dudley, Jr., John M. Gray, Jr., John A. Pitts and J. T. Jenkins. The following officers were re-elected to serve for the ensuing year: R. M. Dudley, president; John M. Gray, Jr., vice-president; R. H. Dudley, Jr., secretary; J. T. Jenkins, treasurer.

SOUTH CAROLINA INTERSTATE AND WEST INDIAN EXPOSITION, Charleston, S. C., have awarded the following medals to F. E. Myers & Bro., Ashland, Ohio: Certificate No. 1054, bronze medal on Myers Glass Valve Seat Pumps, also on Hay Tools; Certificate No. 1178, silver medal on Myers Stayon Door Hangers. These awards are said to be the highest in their respective classes.

RONBERG & Co., Ashtabula, Ohio, are erecting a plant for the manufacture of their patent Shovel. They expect to have the plant in operation within a month, as the machinery is all in hand and is rapidly being installed.

LOUISVILLE SHOVEL COMPANY, Louisville, Ky., are doubling their capacity on account of the large business coming to them from the trade. As soon as the new machinery is installed they will have a capacity of 200 dozen Shovels per day, and will make a complete line of Plain and Hollow Back Shovels, Spades and Scoops.

THE GUILDERLAND FOUNDRY COMPANY, Guilderland, N. Y., are manufacturers of Cast Iron Fittings for steam, gas and water, having been incorporated in 1900. O. Chan Wells, 10 Havemeyer Building, New York, is their direct representative, taking the entire product of the company and marketing it.

LOCKWOOD MFG. COMPANY.

THE LOCKWOOD MFG. COMPANY, South Norwalk, Conn., for whom Allerton-Clarke Company, 97 Chambers street, New York, are direct representatives, have just issued a complete pamphlet price-list No. 5, based on the prices adopted April 10, applying to their 1897 portfolio and 1894 catalogue. They have added a classified index and price-list of all active goods illustrated in their 1894 book, which covers an extensive and varied line of Builders' and Shelf Hardware, to which they are continually adding new goods. Special mention is made of the Lockwood fine Cylinder Locks, which can be master keyed and grand master keyed, a marked feature of which is their heavy Corrugated Key of a peculiar section.

Abel Kimball has purchased the interest of Dwight Strong in the Hardware business at Madison, Ohio, conducted under the name of Kimball & Strong, and the store will be continued under the style of Kimball Bros., Carl Kimball and Abel Kimball being the members of the firm.

Special Brands Again.

A Manufacturer's Reply to Letter of Simmons Hardware Company in The Iron Age, July 3.

IN your last issue, A. W. Douglas, the secretary of the Simmons Hardware Company, writes entertainingly concerning the relative value of makers' and jobbers' brands. The article is well worded; it is plausible, and it is forcible, but after reading it through I cannot but think that the jobbers' brands are treated from an ideal standpoint instead of one based upon actual conditions. IF the jobber made quality the desideratum rather than price; IF the maker put his best —the pick of his best—goods into special brands and the rest into his own first quality brand—IF the jobber's buyer were a better judge of the goods than the maker and able to select the best in every instance—IF the maker found an element of permanence in any private brands—IF a jobber's brand put the goods on a non-competitive basis—IF it were easier to settle claims with the jobber than with the manufacturer—IF the name of Simmons had a greater significance to the user than that of any one of a score of makers whose brands have become identified with the high quality they represent—IF the dealer preferred to tie up to any single jobber rather than have a full field for his purchases—then Mr. Douglas' premises would be well taken and his arguments would be unanswerable. On the contrary, he makes statements arbitrarily, asserting as facts things long under dispute, and taking for granted conditions which do not exist; at least, in a general way. Throughout his article he seems to refer to conditions affecting some particular Simmons' brand. Whether fairly stated or not, the dealers of the South and Middle West are the best judges; but that his statements do not reflect the general condition of things must be evident to all.

Quality Above Price.

How many manufacturers have found it only necessary to prove the superior merit of their goods to get the jobbers' trade for his private brands? Is it not rather the case that the jobber who finds the manufacturer stubborn regarding reductions in price of factory brands endeavors to get the coveted discount on a private brand of the same grade? Many times the maker agrees to protect his jobbing friends against the market on his factory brand, and to reduce his price to one would be to lower his price to all. But, argues the jobber, the private brand is a horse of another color, and an extra 5 on the "Easy Edge" brand cannot affect the market on the maker's product in general. The source of supply is kept secret, anyway, and no one will be the wiser.

Is the Jobber's Brand Non-Competitive?

No! Just as soon as one jobber gets an article which in appearance or finish has an engaging individuality, every other large jobber seeks to duplicate it. A few years ago a large jobber put on the market blued tools under the True Blue brand. Almost immediately competing brands, with the same identical finish, made their appearance, and it was not long before all the distinctiveness gained from this particular finish was lost. Every manufacturer who puts goods up in an especially attractive form under a private brand has opportunity to do likewise for competing jobbers. In fact, so soon as he realizes the extra desirability of the goods he usually approaches competing jobbers with a proposition to duplicate the favorite goods under another brand. Does not the jobber usually buy goods under his own brand to match in quality and price some other brand of another jobber, and instruct his salesman that the Easy Edge brand matches the other man's Broad Blade goods and are identical in every way? So far from eliminating competition the jobber's brand invites it, for the limitations with which the maker has hedged about his goods are thrown down, and the terms of sale, price and all conditions are subject to the whim of the individual jobber seeking to best a competitor working on the same basis. Every jobber's salesman and every retailer knows that when certain makers' brands are quoted they are upon a strictly regulated basis, while on jobbers' brands the terms may be one thing to-day and another to-morrow, according to the source of supply.

Unchanging Quality.

Mr. Douglas asserts that the jobbers' brand gives its owner an advantage in the maintenance of quality. Surely this is unreasonable to believe. Will he, or will any one, state that the quality of any of the makers' brands of tools that are standard to-day has changed for the worse in the past ten years? Is it believable that a jobber's buyer, with his limited knowledge of the quality or little ability to make intelligent tests, can keep the quality of goods more even by buying from several factories in turn than the maker with his skilled workmen and his trained judgment can in a single plant under even conditions each day? When the smatterer knows more than the specialist, when the man at the desk knows more about metal than the man at the forge or the tempering fire, then such things may be. But, surely, not until then. Did you ever watch a jobber's buyer examine a Hand Saw? He will shake the handle to make the blade whirr, bend it in a circle, release the end suddenly and sight along the back; look along the teeth to note the "set"; tap it with his fingers and listen to its ring—and lay it down knowing just as much about it as he did when he picked it up. What does he know of the "hang" of a Handled Axe? How many of them know anything about bitt steel or welds? The A B C of the manufacturers' law is Greek to him. He is a judge of etching, and labels, and polish, and wrapping, and boxes, but what have these to do with the real quality of the tool to the user? No! No! The buyer is not the man who can keep up a higher standard of excellence than any one honest manufacturer who values his reputation. Nor do manufacturers change their management or their standards nearly as often as jobbers change their buyers—each with his own standard and methods of judging excellence.

Does the Maker Prefer to Manufacture Jobbers' Brands

and does he give them greater care than the factory brands, as Mr. Douglas infers? Does it seem likely? Some years ago one of the principal Axe factories charged 25 cents more per dozen for the factory brand than for the private brands. Others made them at the same price, and in general private brands were held in disfavor. That makers do not prefer to deal in jobbers' brands is shown by the fact that the programme announced for a recent manufacturers' convention contained, among other topics, a discussion as to means for doing away with jobbers' brands.

The manufacturer of good goods sets a high standard of excellence for his best brands. Is it reasonable to suppose that he will set it higher for other brands, or that there will be more seconds culled out of a lot of goods made under a private brand than under his own? It is greatly to be doubted.

A False Logic.

Mr. Douglas thinks that the manufacturer's incentive to protect the quality of his goods is less than that of the jobber, since the value of the goods sold under the brand are much greater in the jobber's case. In other words, that the jobber is much more anxious to protect a $75,000 business, which is, say, 5 per cent. of his entire trade, than a manufacturer is to protect a $30,000 business, which is his all. On like basis I care much less if my $6000 house burns, leaving me homeless, than Senator Woghum does when fire consumes one of his three mansions. Or, a one-eyed man who loses the sight of his remaining optic is only half as sorry as the two-eyed man who lost one. It may be so—in St. Louis.

From the Retailer's Standpoint.

In considering the matter from the retailers' standpoint, Mr. Douglas overlooks one important feature. The ordinary retailer does not care to "tie up" to any one jobbing house, and, if a shrewd buyer, prefers goods

on which there is open competition, enabling him to buy standard brands from different sources and keep his stock uniform without losing the advantage of an open market. If Disston Saws or Stanley Planes or Maydole Hammers are handled he can get them in almost any shipment of goods from any jobber, buying where freight, time and price are in his favor. If he buys the Easy Edge goods he must buy them from one source. As to having goods uniform in finish and label, what does the man who buys a "Broad Blade" Razor care whether the dealers' Hatchets, Axes, Chisels, Carpenters' Squares and Manicure Scissors all bear the same label? If he thinks anything at all about it he gets a distrust for a brand which is so universal that it loses significance and regards it as a cloak to hide imperfections. To the ordinary man there is no guarantee of excellence like the maker's name in good, bold letters stamped upon the goods and anything else is but an advertisement of some dealer who handled it. The dealer finds it much easier to arrive at a "take no other" basis on goods bearing the maker's name than any other.

I hope I have not seemed to be unfair. I do not believe I have been, and am sure retailers in general will agree with my statements as they apply to the matter under discussion. Retailers do not care for private brands. Manufacturers do not want them. There is no extra profit or advantage in handling them. The jobber alone profits by their use, and this can only be by squeezing the manufacturer for a lower price at the expense of quality, by a reputation hardly acquired and easily destroyed, or by being able to get a higher price from the retailer, who is unable to accurately judge the market value of the goods. MANUFACTURER.

LETTER FROM THE TRADE.

The following inquiry from a Hardware merchant in South Dakota in regard to the most desirable method of heating his store is referred to our readers:

I have been much interested in "The American Hardware Store," and am just completing a store, 25 x 165 feet. Wonder if some one can tell me how to heat it. With hard coal at $10 and soft $6.50 per ton, which is the cheapest and best, hot air or steam? If your columns are open to such inquiries will be glad to note opinions from brother Hardwaremen.

REQUEST FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

Hugh Russell has nearly completed a new brick building in Ashland, Ky., in which he will open a Hardware store about August 1. Mr. Russell will deal in General Hardware, Tools, Cutlery, House Furnishing Goods, Harness, Buggies, Wagons, &c. Catalogues from manufacturers in these lines are requested.

THE AUTOMOBILE & CYCLE PARTS COMPANY.

THE AUTOMOBILE & CYCLE PARTS COMPANY, with main office at Cleveland, Ohio, and branches at Chicago, Indianapolis and Milwaukee, have recently issued several catalogues relating to their varied products. Hardware Specialties, including Screw Drivers, Nut Picks and Crackers, Towel Racks, Curling Irons, Chimney Stoves, &c., are covered by one catalogue. Another is devoted to Bicycle Fittings, while a third explains the construction and uses of the company's Diamond Chains. Hercules Tubular and Automobile Running Gears are also manufactured by the company.

Williams & Edwards are successors to Hummell & Rowlands, dealers in Agricultural Implements, Buggies, Wagons, &c., Elliott, Iowa.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C.

Proposed Examination of British Hardware Clerks.

A movement, which may possibly develop into something, has arisen out of the last conference of the Ironmongers' Federated Association. This association represents the federated wisdom of the various local ironmongers' associations of England. A conference is held every half year, somewhat on the lines of the American trade conventions, but without, as yet, assuming such large proportions. At the recent conference held in Birmingham two months ago a proposal was made that a system of examinations should be arranged and certificates granted to successful examinees. The need for a better educated type of Hardware clerk is now felt, and some attempts to improve their efficiency is deemed imperative. But while it is thought a good plan to have some system of granting certificates to competent clerks, it is not so easy to organize one. For example, should these examinations be local or centralized? And again, what shape should the examinations take? Further, it is a delicate business selecting the examiners. Some think that as a matter of fact the examination should be centralized and held in connection with the annual conference. Others feel that a system of local examinations would better suit the convenience and the purse of those desiring to enter for examination. The Hardware trade press on this side is inundated with numerous suggestions, but as yet no practical scheme upon which all can agree is forthcoming. The matter is in the hands of a small subcommittee appointed by the central board of the Ironmongers' Federated Association. One gentleman who is taking a great interest in the subject makes the best suggestion I have seen as to the scope of the examination. As the very phrasing of this proposal indicates clearly the scope of the ironmongery trade in this country, I add a few of the suggested divisions of the trade for examination purposes:

1. Furnishing ironmongery, to include Cutlery, Lamps, Electroplate, Culinary Utensils, Garden Tools, Wood Turnery and the other miscellaneous items usually kept by a furnishing ironmonger.
2. Cooking Ranges, Register and other Stoves, Tiles, &c.
3. Agricultural Ironmongery, Sporting Requisites, &c.
4. Builders' ironmongery, to include Black and Brass Foundry, Locks, Latches, Door Furniture, Nails, Bolts and Nuts, Screws, Files and Rasps, Joiners' and Builders' Tools and other sundries.
5. Colliery and Mill Furnishing.
6. Workshop work, to include such things as heating, lighting, ventilation, bell work (both crank and electric), electric lighting, Range and Stove repairing and fixing; also the ordinary blacksmiths' and whitesmiths' work undertaken in an ironmongers' workshop.

It is not a little interesting to observe that with all our talk about technical instruction in this country, a retail trade should find it necessary in its own protection to organize a system of technical examinations distinct from the ordinary academic courses of our technical schools. At the same time it is obvious that there are many advantages in having a special trade examination. To begin with, the questions given by practical examiners must, in the nature of things, apply with striking directness to actual trade methods. Again, the certificate once obtained is necessarily more valuable for distinctly trade purposes than a more general certificate covering ordinary commercial curricula.

The Trade of Wolverhampton.

The annual report of the Wolverhampton Chamber of Commerce affords an excellent index to the general state of trade for the previous year of that very important Hardware center. The following points are extracted from this report, which covers the year 1901: The competition from the Continent, which had commenced in the autumn of 1900, and which had assumed fairly large

proportions at the time of the last report, increased to such an extent that there was quite a monopoly of our British markets by foreign made steel in its intermediate stages. There was a thorough German invasion, and nearly all the iron and steel trade districts of the country had material poured into them at prices which home makers could not attempt to compete with. This was, no doubt, due to the wretched condition the Continental manufacturers were in, through reckless overproduction, the falling away of their home markets and the financial trouble which followed. The banks, which were the debenture holders in large manufacturing concerns who had been encouraged to develop at a phenomenal rate, called upon the manufacturers to realize. Large stocks of pig iron and intermediate steel in the shape of blooms, tin bars and billets, were auctioned at presumably heavy loss, and the material was sent to flood British markets at prices which must have entailed heavy sacrifices. The iron and steel trades of Germany were under a terrible cloud at the time, and this country became a "dumping ground" for an immense tonnage of their overproduced material. This unnatural condition of things somewhat ceased in the early part of the year; the great boom in trade in America still continued, and some fair quantities of intermediate material from Germany and Belgium were delivered to the United States. Since January last our home productions have been in better demand, and our large steel works have been fairly well employed. The marked bar makers have had fair order books, but the unmarked bar firms complain very much of the competition from other districts. The strip iron makers, who are dependent on the tube trade, have been rather quiet during the last six months, but lately the market has improved with them. Pig iron has not varied in price very much since the last report, and the output seems to have gone into consumption and has not been stocked. The bridge builders and constructional iron work manufacturers have all been well employed, and the engineers and iron founders have had a fairly even year's trade. There has been, on the whole, a sanguine feeling that we shall have a very large trade, and there are many substantial reasons for hoping for better times in the near future. The galvanized iron trade has shown further slight expansion during the past year, and, in spite of the interruption to trade, caused by the war in South Africa, the total exports for the year 1901 exceed those of any former year. Prices, however, were considerably lower, owing to reductions in the price of raw materials. There is a steadily growing demand all over the world for this very useful commodity, and it is to Midlanders a matter for regret that, owing to excessively heavy railway rates, this growing trade is leaving them for more favored localities. To an onlooker it may seem somewhat surprising that the railway companies make no effort to save a very lucrative traffic, and view with indifference a considerable volume of business leaving them and locating itself where railways cease from troubling; but, to any one acquainted with the traditions and habits of British railway directorates, there is nothing startling in the fact. There has been a very good, steady demand for Edge Tools during the whole of last year. War Office requirements have been considerable, and, in some cases, could not be met in this country. The Tinned and Japanned Ware trade has been in a very depressed state all through the year. During the past year the makers of Enameled Hollow Ware have been steadily engaged, at more or less remunerative prices. Many of the German enamel works, finding that they have been trading at a loss for some time, have endeavored to form another ring to force prices up. Complaints are being heard on all sides of the deleterious effects of using common foreign Enameled Ware. Business in the Lock trade throughout the year has been fairly steady in the export branches, Australia and New Zealand having been larger buyers since the changes brought about by the new Federal tariff came to be better known. Within the last six months an important business has been doing with South Africa, and the partial reopening of Johannesburg for commerce gives promise of a considerably increased trade in that direction. The home demand throughout the year has been considerably restricted by the great increase in the cost of building, which has checked speculation in this direction all over the kingdom. The Electrical Fittings trades have been good, but have hardly experienced such demand as in the previous year. There has been a large demand for Cycles during the early part of the year, and the better quality makers are exceedingly busy. Prices, however, are cut very fine, and the cheaper class firms are suffering severely from this fact. Most, if not all, of the small local makers have now closed up.

Free Trade and Foreign Competition.

I have several times drawn attention to a distinct change in the attitude of business men toward the question of free trade, and I find it growing with great rapidity. Thus the chairman of the Wolverhampton Chamber of Commerce, speaking at the annual meeting, said that the industrial developments of other countries, more especially of the United States and Germany, and the practice of foreign nations of fostering their manufacturing interests by constantly increasing their import duties, with the declared intention of prohibiting the imports of manufactured goods, called for a reconsideration of the grounds upon which the policy of this country was supposed to be justified. The belief was at one time entertained that other nations would follow our example, but the last vestige of any faith in such a belief had long since disappeared. Not many years ago this country depended for a very large proportion of the necessaries of life upon the foreigner, and such a condition of things was eminently favorable to the application of the policy of free trade. In recent years these conditions had been materially changed, fresh markets had been found and our colonial possessions had multiplied their power to produce such things as we required. The result was that we could now be supplied, and increasingly supplied, with corn, wool, meat, wine and cotton from our possessions abroad. It would also seem that the time was rapidly approaching, and might be hastened by wise methods, when this Empire will be capable of supplying its own wants independently of the action of other nations. The question, therefore, presented itself as to whether, under these conditions, in view of the hostile attitude assumed by other nations in relation to our national industries, the door should be as freely opened throughout our Empire to other nations as had hitherto been the case. He thought the time had come when a commercial union should be established between Great Britain and its colonies, in which the ties of a common brotherhood, so happily recognized now, should be strengthened and cemented by more favorable terms as regarded our commercial intercourse than were granted to other nations. This would involve in some degree a reversal of our policy of the last half century, but he thought that the stability and prosperity of our Empire was of vastly more importance than the adherence to a sentiment which he thought was becoming obsolete. He hoped that the meeting of the colonial Premiers in this country would result in an agreement for the colonists to give England the whole of their trade and that England would offer them a corresponding encouragement.

The Trade of India.

My numerous comments upon the trade of India, all pointing to the importance of cultivating India as a future great market, are borne out by the annual report of British India for the financial year 1901-1902, ending March 31. As showing the extent of the Indian trade and its growth, I give the imports and exports for three years:

	Imports. Rx.	Exports. Rx.
1899-1900	75,304,480	109,083,322
1900-01	80,894,590	107,718,566
1901-02	88,742,420	124,524,857

A heavy increase in the imports of metals and articles manufactured therefrom, including machinery and mill work and steel for various constructive purposes, and copper, is a marked feature of these returns. I again venture to say that the Indian trade has got to be cultivated, and the sooner the better.

Metal Trade with South-western France.

Bordeaux imports in large quantities many lines of trade in which Americans can compete. The following, for example, given with the quantities for last year and the year before, indicate clearly what is doing:

	Total quantities imported from abroad.	
	1900. Cwts.	1901. Cwts.
Iron and steel	313,153	178,495
Copper	10,222	4,222
Lead	12,000	12,424
Tin	6,026	6,119
Varnish	885	1,000
Paint and colors	720	1,177
Machinery	181,830	114,751
Hardware	39,529	22,696

The following notes on the above table will enable exporters more readily to understand the nature of the trade:

The principal items of importation under iron and steel were cast iron, containing less than 25 per cent. of manganese, 29,711 cwt., against 122,192 cwt. in 1900; and tinned plates, 43,412 cwt., against 59,540 cwt. in the previous year, and 25,039 cwt. in 1899.

The principal item imported under copper was under the heading of "pure or alloyed with zinc or tin of first fusion, cast in lumps, bars, pigs or slabs," 541 cwt., against 1717 cwt. in 1900, and 3069 cwt. in 1899. The total importation of this article fell from 7832 cwt. in 1900 to 3092 cwt. in 1901.

The lead imported was chiefly in crude lumps or pigs, 6468 cwt. against 10,148 cwt. in the previous year.

The quantity of ground oil paint imported rose to 430 cwt. (out of a total of 440 cwt.), against 191 cwt. in 1900; 283 cwt. in 1899, and 751 cwt. in 1898. There was a falling off in colored washes for wall papers, &c., the amount imported being 230 cwt., against 445 cwt. in the previous year. The amount of writing and printers' ink imported was 32 cwt., being 1 cwt. more than in the previous year.

The principal items of imported machinery were stationary engines, 2098 cwt., against 2542 cwt.; threshing machines, 4589 cwt., against 4125 cwt.; agricultural machinery, 9936 cwt., out of a total of 67,046 cwt., against 11,418 cwt., out of a total of 67,504 cwt. in the previous year; sewing machines, 13,223 cwt., against 8682 cwt. Other items were machine tools, 915 cwt., against 2578 cwt.; general machinery, such as balances, transmission gearing, &c., 1287 cwt., against 2177 cwt. Locomotives and traction engines showed no importation in 1901 beyond 182 cwt. from the United Kingdom. It will be noticed that the sewing machines imported from the United Kingdom surpassed very considerably in weight the agricultural machinery imported from there. The amount of the latter imported from the United States is seven times as great as that from the United Kingdom, whereas in 1896 the importation was fairly evenly divided between the two countries. The reason for this is that British firms do not study the requirements of the farmers and peasantry, or the nature of the country, soil and work to be done in the way that American manufacturers do. Moreover, the latter appear to be able to put more strength into a lighter machine. If British manufacturers of agricultural machinery thus fall behind in the small matter of France, where will they be in the opening up of the enormous tracts that will be under cultivation in the near future in Asia, Africa and America? Textile cleaning machines amounted to 137 cwt., against 69 cwt.; throstles, complete for spinning and twisting, 130 cwt., against 298 cwt.; spinning looms, 386 cwt., against 925 cwt. in the previous year.

The principal items in Hardware were Steel Tools, 821 cwt., against 854 cwt.; Iron and Steel Netting, 20 cwt., the same amount as in 1900; Sewing Needles, 14 cwt., out of a total of 19 cwt.; Fish Hooks, 11 cwt.; Steel Pens, 23 cwt.; Common Cutlery, 97 cwt., against 17 cwt.; Cast Iron Goods, neither turned nor polished, 791 cwt., against 657 cwt.: Steel and Iron Constructions, 4419 cwt., against 15,018 cwt.; Anchors, Cables and Chains, 869 cwt., against 687 cwt.; Horseshoe Nails, 467 cwt., against 98 cwt.; Screws, Rings, Bolts and Nuts, 211 cwt., against 175 cwt.: Iron and Steel Tubes, 1176 cwt., against 2201 cwt.; Plain, Painted and Polished Household Wares, 832 cwt., against 568 cwt. in 1900 and 259 cwt. in 1899; Enameled or Turned Household Wares, 908 cwt., against 597 cwt., and Lead Piping, 281 cwt., against 159 cwt. in the previous year.

Anton Enger, Cooperstown, N. D., has been succeeded in the Hardware business by Evenson & Allen. The firm have put in a new plate glass front and also added a stock of jewelry.

PRICE-LISTS, CIRCULARS, &c.

THE J. STEVENS ARMS & TOOL COMPANY, Chicopee Falls, Mass.: Illustrated catalogue and price-list of Target and Sporting Rifles, Single Barrel Shotguns, Pistols, Rifle Telescopes, Sights, &c. On the inside of the back cover is a list of new goods added since January 1, 1901, which includes such articles as Rifles, Hammerless Shot Guns, Telescopes, Cleaning Rods, Gun Cleaner, Rifled Bullet Shell, Automobiles, &c.

WILEY & RUSSELL MFG. COMPANY, Greenfield, Mass.: Screw Cutting and other Labor Saving Machinery and Tools. An illustrated catalogue and price-list relates to these goods.

FERNALD MFG. COMPANY, North East, Pa.: An illustrated catalogue is devoted to Anti-Rattlers, Lifting Jacks, Cash Drawers, Bridle Bits, Neck Yokes, Whip Sockets; &c.

THE HUNTER ARMS COMPANY, Fulton, N. Y.: Illustrated catalogue describing the L. C. Smith Guns.

THE CORTLAND WAGON COMPANY, Cortland, N. Y.: A descriptive illustrated catalogue of High Grade Carriages.

SARGENT & GREENLEAF COMPANY, Rochester, N. Y.: Illustrated catalogues of Combination Bank and Safe Locks. The company have recently bought out the Burton-Harris bolt actuating device, with all patents, patterns, tools, &c., and have added this locking security to their line of goods manufactured for use on bank vaults, safes, &c. The company advise us that their Time Locks have been used in connection with the Burton-Harris devices for several years, and that they have improved the principle of these devices in some minor parts.

PECK EDGE TOOL COMPANY, Cohoes, N. Y., manufacturers of the Champion Blade Axes, Adzes, Hatchets, &c., represented by John H. Graham & Co., 113 Chambers street, New York: A new illustrated catalogue of their entire line. These goods have been made for over 40 years, and are hand hammered, not drop forged. The company are expanding their market by making a specialty of Spanish Axes for South American trade and American goods for Australia and South Africa.

ROCHESTER OPTICAL & CAMERA COMPANY, Rochester, N. Y.: Cameras. A number of illustrated catalogues relating to photography.

WILLIAM YERDON, Fort Plain, N. Y.: Yerdon's Improved Double Hose Band and Perfected Can Openers. The Hose Bands are for use on ¾ to 2½ inch four-ply Hose. A pamphlet illustrates these articles.

THE O. C. WHITE COMPANY, Worcester, Mass.: An illustrated catalogue relates to adjustable fixtures for incandescent lamps, whereby the light is brought to bear upon the object, instead of the object having to be placed relative to the light.

ADRIANCE, PLATT & Co., Poughkeepsie, N. Y.: Mowers, Binders, Reapers, &c. Catalogues illustrate and describe these machines.

THE INVINCIBLE GRAIN CLEANER COMPANY, Silver Creek, N. Y.: Grain Scourers, Separators and Packers for flour, lime, facings and other materials. Illustrated catalogues describe the machines.

THE HOPKINS & ALLEN ARMS COMPANY, Norwich, Conn.: Firearms, An illustrated catalogue is devoted to Guns and Revolvers.

J. R. CLANCY, Syracuse, N. Y.: Catalogues are devoted to Theatrical Stage Hardware and to Sure Grip Rust Proof Hose Clamps.

THE WESTINGHOUSE COMPANY, Schenectady, N. Y.: Threshing Machinery, Traction Engines, Circular Saw Mills, Stationary Engines and Boilers, &c. A catalogue describes and illustrates this line.

WALTER A. WOOD MOWING & REAPING MACHINE COMPANY, Hoosick Falls, N. Y.: Harvesters and Binders, Mowers, Hay Rakes, Hay Tedders, &c. Illustrated catalogues describe these machines.

A. L. SWETT IRON WORKS, Medina, N. Y.: Descriptive catalogue of Hardware and Plumbers' Specialties.

ROCHESTER CARRIAGE MOTOR COMPANY, Rochester,

N. Y.: Catalogue showing Light Runabout Motor Carriages.

THE BRISCOE MFG. COMPANY, Detroit, Mich.: Special catalogue showing Air Tight Stoves, Galvanized Tubs and Pails, Oil Cans, Rural Mail Boxes, &c.

THE WILKINS TOY COMPANY, Keene, N. H.: Pressed Steel and Malleable Iron Toys. An illustrated catalogue shows a varied line of Toys.

THE EAGLE LOCK COMPANY, Terryville, Conn.: Supplementary sheets for their catalogue showing Drawer, Sewing Machine, Pad, Suit Case and Trunk Locks.

THE SYRACUSE CHILLED PLOW COMPANY, Syracuse, N. Y.: Catalogue No. 26. This illustrates Plows, Harrows, Cultivators, Haying Tools, Scrapers, Store and Warehouse Trucks, Steel and Wood Wheelbarrows, Push Carts, &c. It is accompanied by a circular giving price-list on the goods represented.

THE DEDERICK AGRICULTURAL & MACHINE WORKS, Albany, N. Y.: Columbian and Continuous Baling Presses. A descriptive illustrated catalogue relates to these goods.

INDIANAPOLIS BRUSH & BROOM MFG. COMPANY, 26-30 Brush street, Indianapolis, Ind.: Brooms. A circular shows these made of a mixture of broom corn and soft china rattan, for factories, steel and iron mills, foundries, railroads, warehouses or for any sweeping of a rough nature.

E. C. ATKINS & Co., Indianapolis, Ind.: Changes in list prices of Inserted Tooth Saws. These are printed on slips for insertion between proper pages in the firm's mill supply catalogue.

SEDGWICK MACHINE WORKS, 86 Carroll street, Poughkeepsie, N. Y.: Dumb Waiters and Hand Elevators. Catalogue F contains several new styles of Dumb Waiters. The manufacturers advise us that they are steadily increasing their facilities and that they are taxed to their full capacity in filling orders.

THE FINDLAY AXE & TOOL COMPANY, Findlay, Ohio: Axes, Edge Tools, Picks, Mattocks and Grub Hoes. An illustrated price-list and catalogue of 56 pages relates to these goods.

THE HART MFG. COMPANY, Cleveland, Ohio: Duplex Die Stocks and Thread Cutting Tools. An illustrated catalogue states that their entire line of Die Stocks has lately been remodeled and improved.

THE AMERICAN RENNET EXTRACT COMPANY, Syracuse, N. Y.: Apparatus and Supplies for cheese factories, creameries and dairies. An illustrated price-list relates to these goods.

THE W. S. TYLER COMPANY, Cleveland, Ohio: Wire Cloth. An artistic catalogue of nearly 100 pages devoted to this branch of the company's business contains effective illustrations of the uses of Woven Wire and also lists, weights and tables relative to Wire Cloth, with accurate dimensions in decimals of the mesh. The company advise us that their business has grown and developed along mechanical lines, and that their capacity has been materially increased.

THE GRAND RAPIDS HAND SCREW COMPANY, Grand Rapids, Mich.: Catalogue illustrating Hand Screws, Case and Glue Clamps, Cabinet Makers' Benches, Trucks, Saw Guards, Saw Tables and other factory furnishings.

THE ALLITH MFG. COMPANY, 122 and 124 South Green street, Chicago: "Book About the Reliable Door Hanger," illustrating the device as applied and the various parts. A portion of the book is devoted to letters and testimonials from patrons of the company.

LANE BROTHERS COMPANY, Poughkeepsie, N. Y.: Illustrated catalogue No. 17, relating to their line of Hardware specialties. It represents Barn Door, Elevator, Parlor Door and Fire Door Hangers, Coffee, Spice and Drug Mills, Self Measuring Faucets, Steel Jacks, Stay Rollers, Store Ladders, Tackle Blocks, &c.

THE CHICAGO HOUSE WRECKING COMPANY, Chicago, Ill.: Illustrated catalogue and price-list No. 125. The company handle everything that can be bought at sacrifice prices The catalogue, containing 240 pages, is devoted to Hardware, Machinery, Mill Supplies, Plumbers' Goods, &c.

GOODELL COMPANY, Antrim, N. H.: Supplemental sheet, to be inserted in their catalogue B. It relates to Carvers with stag, ivory, celluloid and rubber handles, some of the goods having sterling silver ferrule and cap. The blades range in size from 7 to 9 inches. These goods are referred to as of the best quality, handsomely finished and put up in their attractive new package. The supplementary sheet with accompanying circular is sent out in a large envelope, printed conspicuously on which is the statement: "To have been first but proves antiquity; to have become first proves merit."

A. W. STRAUB & Co., Philadelphia, Pa.: Catalogue illustrating and describing their line of Quaker City Grinding Mills, for hand and power. Some of the mills contain improvements for 1902. The company advise us that during the past two years they have shipped over 3000 of their Quaker City Drug and Peanut Butter Mills to Mexico, where they are employed to grind the corn used in making tortillas, which are thin cakes of corn baked on a griddle and served hot.

PACIFIC COAST HARDWARE & METAL ASSOCIATION.

THE annual meeting of the Pacific Coast Hardware and Metal Association will take place at the Hotel Del Monte, Monterey, Cal., on July 16, 17 and 18, at which time the annual reports will be presented, new officers elected and subjects of general interest to the jobbing trade of the Pacific Coast discussed.

J. EDWARD OGDEN COMPANY'S NEW CATALOGUE.

J. EDWARD OGDEN COMPANY, 147-149 Cedar street, New York, wholesale dealers in Heavy Hardware, Contractors', Railroad, Electrical, Mine, Mill and Dock Builders' Supplies, have just issued catalogue No. 6 of this class of goods, containing 421 pages, each 10 x 7 inches, and bound in stiff covers, for gratuitous distribution on application. The goods illustrated and described are of standard makes and very comprehensive in character.

AMONG THE HARDWARE TRADE.

James G. Speir has lately disposed of his business in Goshen, N. Y., to the Goshen Hardware Company, who will continue at the old stand. Mr. Speir was engaged in the Hardware line in Goshen for a period of 35 years, during which he earned the confidence of his patrons and built up a successful business. Mr. Speir is now located in Seattle, Wash. where his son is associated with the Seattle Hardware Company.

The following retail Hardware stores in New York City, located on Columbus avenue, from 91st to 106th street, have, in accordance with their custom of the past three years, agreed to close at 6.30 p.m. during the week, except Monday and Saturday evenings, from June 16 to September 13: Union Hardware & House Furnishing Company, L. Christman, A. Krackar, Enterprise Crockery Company, T. J. Ryan, J. Kafka, A. Werner, H. Winter.

Bare Bros., Mansfield, Ohio, have incorporated for $25,000. The new concern will be known as the Bare Bros.-Martin Hardware Company. The following are the officers: Frank A. Bare, president; W. L. Kile, vice-president, W. B. Martin, secretary and treasurer. The new company will do a wholesale and retail business, giving special attention to Factory Supplies. A number of new lines will be added.

Garden City Hardware Company are a new concern in San José, Cal. The principal shareholders are S. B. Bogart and Albert Schroeder, both men of considerable experience in the business, Mr. Schroeder having been for many years connected with the San José Hardware Company.

Stander & Esmay, Louisville, Neb., have succeeded Esmay & Rogers in the Hardware, Stove and Tinware business.

S. J. Henry has succeeded Henry & Clayton in the retail Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods business in Central City, Neb. Mr. Henry has remodeled the store and more than doubled the former stock.

Stough & Warrington, in the general merchandise business in Ponco, Neb., have been succeeded by William Stough. Mr. Warrington and his son have removed to Creighton, Neb., where they have purchased a Hardware store.

English & Hill have succeeded J. F. Wheeler in the Agricultural Implement business in Wyocena, Wis.

G. E. Gard, in the Hardware, Stove and Farm Implement business in Troy Mills, Iowa, has been succeeded by E. F. Biggs.

The Union Hardware Company, Arkansas City, Kan., have been succeeded by the Hamilton Hardware Company. The capital has been largely increased under the new style, but there has been no change in the management.

The Drysdale-Ulen Hardware Company, dealers in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, &c., Bloomfield, Mo., have been succeeded by Drysdale-Buck Hardware Company.

F. H. Pickett is successor to C. B. Payne in the Hardware, Stove and Tinware business in Cassadaga, N. Y.

W. A. Roberts & Co., Cuthbert, Ga., have dissolved by mutual consent, W. A. Roberts retiring and Boyett & Gunn assuming all liabilities of the firm. Boyett & Gunn will continue the business at the old stand under the style of Cuthbert Hardware Company.

Geo. W. Snapp & Co. have disposed of their Hardware, Stove and Sporting Goods business in Maryville, Mo., to Hudson & Leet.

Charles Try, dealer in Hardware and general merchandise, Farlin, Iowa, sustained fire damage a short time since.

Garth & Ware are successors to G. E. Garth & Co., Hardware and Farm Implement merchants, Trenton, Ky.

Delray Hardware Company, Delray, Mich., have incorporated with a capital of $5000. The company handle at retail Shelf Hardware, Stoves and Tinware, Agricultural Implements and Sporting Goods.

Tool & Worthen, Sterling, Neb., have sold their Hardware and Stove business to T. J. Harris & Co.

Nash Hardware Company, Fort Worth, Texas, wholesale and retail Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods, have increased their capital stock from $40,000 to $75,000. The company advise us that during the past year they enjoyed the largest and most satisfactory trade in their history. They are enlarging their office and are getting in shape to push their jobbing interests more than ever the coming Fall and Winter.

The Hardware store of Whipple & Robinson, Glens Falls, N. Y., was destroyed by fire a few weeks since. The firm, who are dealers in Shelf and Heavy Hardware, Tinware, Sporting Goods, with plumbing, heating and roofing department, have resumed business in temporary quarters.

Frank McGuire, in the Hardware and furniture business in Defiance, Iowa, has been succeeded by McGuire & Huselbus.

L. Whitney has bought out his partner in the firm of L. Whitney & Co., Carbonado, Mont., and has removed the stock to Joliet, Mont., where he is now located.

A. Anderson has lately embarked in business at Chillicothe, Ill., handling a line embracing Shelf Hardware, Stoves, Farming Implements and Buggies.

The warehouse of J. T. Clough, Hardware merchant, Colorado Springs, Col., was recently damaged by fire. The loss on stock was $2500 and on building $125; fully insured.

The Hardware store of Jas. T. Fox & Co., Fremont, Iowa, has been destroyed by fire. The firm are rebuilding in the shape of a one-story brick structure, 44 x 120 feet. They deal in Hardware, Agricultural Implements and Buggies, and are considering the addition of a line of furniture.

C. H. Sibley, dealer in Farm Machinery, Wagons, Buggies and Harness, Tilden, Neb., has been succeeded by Sibley & Davis. The new firm are making enlargements in Harness shop and Implement buildings.

Mason Bros. have purchased the Hardware store of Worley & Warner, Weeping Water, Neb. The new owners will make important improvements in the establishment, shelving both sides of the store to the ceiling and putting in rolling ladders. R. E. Mason, senior member of the new firm, is now general agent of the Grand Island, Neb., branch of the Piano Mfg. Company of Chicago. H. E. Mason, junior member, who is in charge of the store, has for several years been employed as traveling salesman by the Rector & Wilhelmy Company, Omaha.

Geo. B. Edwards has entered into partnership with his father, G. W. Edwards, in the Hardware and Stove business in Mendota, Ill., under the style of Edwards Hardware Company. It is the firm's intention to increase their line and variety and run a strictly first-class Hardware and Stove store. G. W. Edwards has conducted this business since its establishment in 1866. Mr. Edwards' son is a stockholder of the Acorn Brass Works of Chicago, with whom he has been connected for the past three years. Wishing to get away from city and office life, and feeling the need of more active employment, Mr. Edwards has made the change above outlined.

Dufendach Hardware Company, Huntingburg, Ind., have purchased the building now occupied by William Roettger & Co., manufacturers of Wagons. This building is of brick, two stories high, 43½ feet front by 85 feet deep. Back of the building is a frame warehouse, 25 x 50 feet. The brick structure will be remodeled, a new plate glass front put in, also metal ceilings and up to date shelving and fixtures. A general stock of Hardware will be carried on the first floor and Agricultural Implements on the second. The firm will not get possession of the building until September.

The Coffey Hardware Company, Coffeyville, Mo., have incorporated with a capital of $13,000 and the following officers: David Lierley, president; J. N. Hamaker, vice-president; A. I. Pratt, secretary; J. B. Handy, Ira Day, Ed. McClung, H. R. Hill and J. W. Lierley, directors. A two-story brick building will be erected just west of Lierley & Son's store. The first floor will be stocked with furniture and the second with Implements and Vehicles, Hardware, Stoves, &c., being carried in the Lierley store.

J. R. Dumas, Rockwell, Texas, suffered slight damage from fire a short time since. Mr. Dumas' loss was fully covered by insurance and he is again doing business at the old stand.

Steel & Leslie and Tibbetts & Scott, Hardware, Farm Implement and Sporting Goods dealers, Delhi, Minn., have dissolved, and the Messrs. Tibbetts and Leslie of the former concerns have organized a new firm, under the style of Tibbetts & Leslie, who will continue in the Hardware, Stove, Farm Implement and Sporting Goods business.

Breckenridge & Bradshaw have disposed of their business at Battle Ground, Ind., to Sherman Shigley, and have bought the Gould, Oliver & Martin stock in Crawfordsville, where they are now located. Their line comprises Hardware, Stoves and Tinware.

William S. Whitney has withdrawn from the Hardware firm of Noxon & Whitney, Middletown, Conn., and Joseph F. Noxon will continue the business under the style of Noxon & Whitney Company.

The Hardware stock of Wind Hardware Company, Talbottom, Ga., was badly damaged by fire a short time since.

H. Miller has succeeded H. Miller & Co., in the Hardware, Farming Implement and Mining Supply business in Eldora, Col.

H. W. Morse, Meriden, Conn., dealer in Sole Leather and Shoe Findings, has added a general line of Hardware to his store at 20 State street.

Feeling the need of larger capacity, Ashland Hardware Company, who are wholesalers and retailers of Shelf and Heavy Hardware, Agricultural Implements and Sporting Goods, Ashland, Ohio, will remove to what was formerly the Miller House, which will be entirely remodeled. The whole front will be removed and replaced with pressed brick and plate glass.

MISCELLANEOUS NOTES.

Marvel Nutmeg Grater.

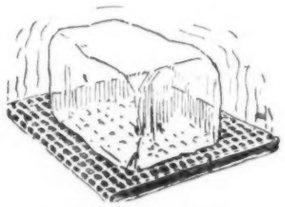
Franklin Specialty Company, 627-631 Franklin street, Reading, Pa., are manufacturing the Marvel nutmeg grater, which is so made that a whole nutmeg can be placed in a suitable pocket or receptacle and by pressure of a round wire spring, parallel with the cast iron handle, about 8 inches long, the nut is forced automatically against a perforated disk grater about 2¾ inches in diameter, which by means of a cast iron handle is revolved with the remaining hand. The advantage of this construction is that the nutmeg is kept in place, always ready, and can be used up entirely without necessitating any contact of the fingers either against the nut or the grating surface. The entire surface, which is of iron, is tinned. This company also manufacture a full line of 10-cent goods in the way of hardware specialties, including cast iron hammers, towel racks, clothes line hooks and goods of kindred character.

Cheese Hoops.

Frank L. Jones, Utica, N. Y., is manufacturing for Western trade some odd sized cheese hoops for cheese 6 inches in diameter by 15 inches deep and weighing 15 pounds. The Jones patent hoop, it is remarked, having a removable bottom plate is adapted for this deep or long style cheese. The hoops are supplied tinned or galvanized.

The Savin Ice Pad.

A new invention for reducing the consumption of ice in refrigerators and ice boxes is illustrated herewith. The device consists of a chemically treated felt pad inclosed in galvanized iron wire. It is claimed by the manufacturers that it will absorb the odors arising from the ice box and prevent the usual occurrence of slime on the side wall. A saving of 33 1-3 per cent. in the consumption of ice is claimed by the company. Practical demonstration has shown that the temperature of a refrigerator is lowered several degrees with the use of the pad and that ice of the same weight will last much longer than in a box without the pad. The manufacturers state that there is nothing injurious in the pad and that water percolating through it can be used with perfect freedom. In use the pad is placed on the bottom of the ice compartment and the ice placed upon it, as shown in the illustration. The pads are made to fit any size box, it being necessary, however, that an inch air space be allowed on each side for free circulation of air currents. The only precaution to be observed, it is remarked, is that the pad should always be kept in a moist condition, for if allowed to become dry it loses its chemical properties. The Savin Ice Pad Company, 1317 Columbia avenue, Philadelphia, Pa., are the manufacturers of the pad, which is now being placed on the market.



The Savin Ice Pad.

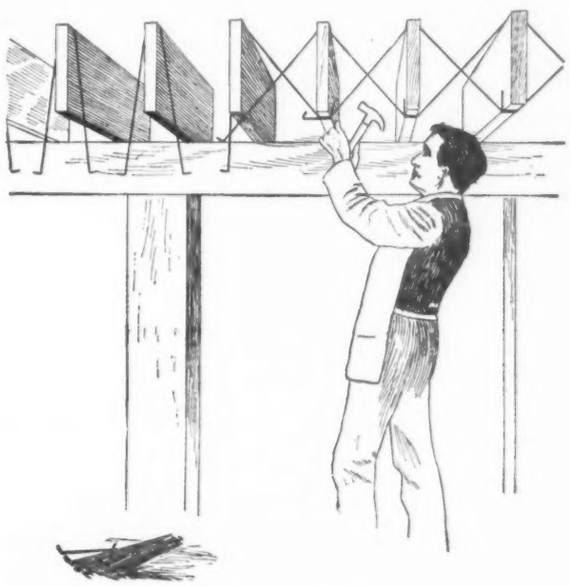
Time Saving Shoe Fitter.

Bradley & Depew, Little Falls, N. Y., for whom Crane & Halpin, 62 Reade street, New York, are general agents and sole representatives for export, have just put on the market the Time Saving shoe fitter, here illustrated. It consists of a piece of polished hard wood, natural finish, the extreme dimensions of which are 17 x 3 x 5-16 inches. Opposite the handle is a brass back 2 inches high, against which the heel of the customer's stockinged foot is placed. The figures, in legible black on either side of the flat brass strip, indicate the length of the size for any foot from infant to adult in both sexes. The tape, 20 inches long, which comes with the device, is then passed over the ball of the foot or widest part, when by referring to a series of six tables printed in large black figures on the back the length and width of any shoe required is seen at a glance, thus enabling the salesman to get at once the proper shoe, so far as size is concerned. The tables at the back show *in extenso* all sizes, length and width, and are grouped under the following designations, six in all: Women's, men's, youths', boys', child's and misses'. Of the front figures the column to the left of the brass strip is what is used universally by shoe dealers, the other lengths on the right corresponding with the stick measure used regularly by shoe manufacturers.

Time Saving Shoe Fitter.

Metallic Joist Bridging.

The Metallic Tension Bridging Company of Chicago are manufacturing a patented metallic joist bridging, shown herewith. It is made in pairs of wire drawn especially, requiring no cutting and no nails, to reduce

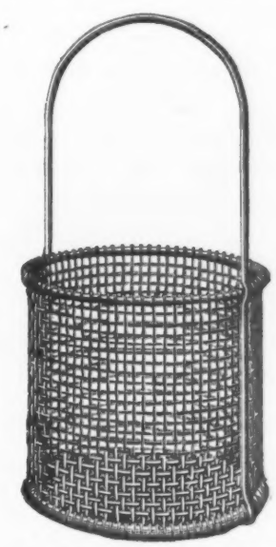


Metallic Joist Bridging.

the amount of labor required in fastening to a minimum. It is pointed out that it costs less and is lighter than the wooden bridging, and that its use overcomes the tendency to irregular spacing. The accompanying illustration indicates the mode of application. The act of wrapping it around the lower edge of the joist on driving the end in on the further side takes up all the slack and makes, it is remarked, a rigid system of joists.

Aluminum Dipping and Plating Baskets.

The accompanying cut represents an aluminum dipping and plating basket offered by Edward F. Smith & Co., 23 Center street, New Haven, Conn. A special cloth is made for the baskets, while hard wire is used instead of soft to make them more rigid and less liable to be knocked out of shape. It is explained that the wires are

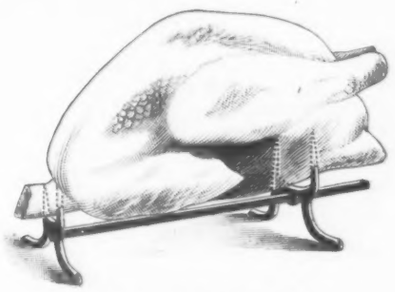


Aluminum Dipping and Plating Basket.

crimped both ways of the mesh, so that the meshes are more even and the wires less liable to slip out of place; also that neither iron, brass nor copper wire is used, and that the frame work is very thoroughly put together. The baskets are made in a variety of styles, sizes and meshes, and the firm remark that they are ever ready to carry out the ideas of customers for any special baskets suited to their work. The baskets are referred to as particularly adapted to use in washing and dipping (except in potash), as acids have practically no effect on them, and they do not retain so much moisture and are not breakable as are the earthen ware.

Roasting and Carving Rack.

The accompanying cut represents a rack on which to roast and carve meat or poultry, offered by A. E. Faber, Jr., 355 Mulberry street, Newark, N. J. It consists of



Roasting and Carving Rack.

a 10-inch square metal rod, upon which is one stationary and one adjustable rest, the latter sliding on the rod to accommodate the length of the roast. After the meat has been roasted the rack and meat are lifted together and placed on a platter. Among other points of excellence the manufacturers allude to the following: That the use of the rack admits of perfect roasting in all parts; that when placed on the platter carving is done with ease and comfort, the roast being held firmly, allowing the use of the fork to hold and distribute the pieces cut off; that the rack firmly secures the roast in a desirable position and provides space under and about the meat for gravy or decoration.

Marble's Seat Pad.

Marble Safety Axe Company, Gladstone, Mich., have brought out Marble's Solid Comfort seat pad, here illustrated, for sportsmen's use, which is an addition to their

Marble's Water Proof Seat Pad.

already large line of sportsmen's specialties. It is made of thoroughly water proof material of durable character, leather bound. It is fastened to the waistband of the trousers with two metallic hooks connected to the pad by adjustable bands of elastic webbing and a narrow leather strap about each leg midway between the hips and knees. The purpose of the device is to provide a soft and warm seat pad to protect the person of the individual against chills, colds, rheumatism, &c., whether sitting for hours on a snow covered log or hillside or upon a tuft of grass in a marsh. The pad is made in three sizes, of brown material, 16, 18 and 20 inches.

The Archer Steel Wheelbarrow.

The Archer Iron Works, Chicago, manufacturers of ornamental and structural iron work, have issued a catalogue with special reference to the steel wheelbarrows which they make and shown herewith. The wheels have the Archer tubular barrels, made of wrought iron; the spokes are of ¾-inch round rod, three of which are strongly welded, forming one-half of wheel. These verge symmetrically from bearing to periphery,

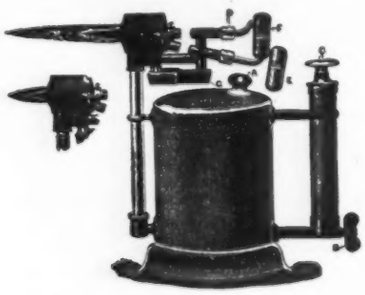
Fig. 1.—The Archer Steel Wheelbarrow.

Fig. 2.—The Archer Barrow Wheel.

giving a breadth across from hub to hub of 13 inches, which is referred to as a feature of great strength and as preventing upsetting while loading. The rim is made of 1½ x 3-8 inch iron, and spokes are riveted to rim with 3-8-inch rivets.

Turner Double Jet Gasoline Torch.

The Turner double jet gasoline torch, manufactured by Turner Brass Works, Chicago, is shown herewith. This blow torch is referred to as of the same general appearance and construction as the ordinary blow torches now on the market, except the burner. It will be seen that there are two valves instead of one, as is



Turner Double Jet Gasoline Torch.

customary in burners of this kind. In this double jet construction one valve controls the air blast and the other the gas. The air and gas enter the combustion chamber in separate jets, and are there united in a blue flame of intensity to fuse nickel, it is claimed. The independent control of the gas and air enables the operator to secure perfect combustion as occasion requires for different kinds of work, thereby securing the maximum amount of heat that is possible by mechanical means. The heat produced by the double jet is said to be 3000 degrees. The double jet torch is claimed to be capable of performing work heretofore considered impossible.

The Rex Adjustable Web Halters.

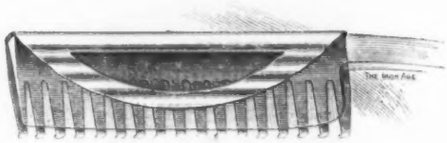
The Alexandria Halter Mfg. Company, Alexandria, Ohio, are offering web halters, as shown herewith. They are made in 8, 12 and 13 cord, with XC rosettes and jute tie, with red, white or blue web as desired.

The Rex Adjustable Web Halter.

The eight-cord is referred to as an attractive little halter, besides being substantial. The manufacturers remark that the castings are light, yet strong and easily adjusted, and that the nose piece will stay up to its place.

Knocut Safety Guard.

C. Kaufmann & Son, 268 West Broadway, New York, have put on the market the Knocut safety guard, by means of which any ordinary razor, in different widths, can be used as a safety razor by merely slipping the

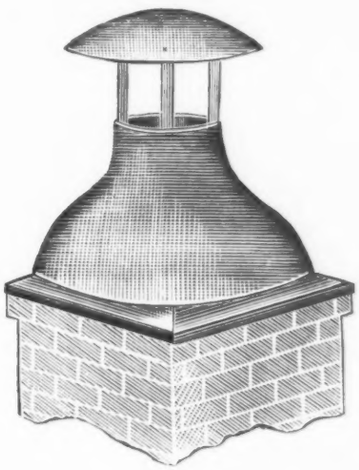


Knocut Safety Guard for Razor.

guard onto the blade, as shown in the illustration, which represents the guard in position for use, the razor portion being a phantom cut designed to show the relation of one to the other. The guard is nickel plated, has a series of longitudinal grooves, adapting it to different widths of razor blade, and can be used equally well by right or left handed men by reversing the position of the guard on the razor. This article is designed to retail at 10 cents each, is put up one in a box and one dozen in a carton. This concern also manufacture various kinds of tin and glass novelties, souvenirs, &c.

The Everlasting Chimney Cap.

The Everlasting cast iron chimney cap and base piece, manufactured by McCahan & Co., 4 North Eden street, Baltimore, Md., is illustrated herewith. This device can be used as the base for any kind of round chimney cap, or it is a complete cap in itself, about 15 inches high. When used as a base on which to place a sheet metal cap, it is only necessary to take off the top or cover, which can be used for the top of the extension. The three holes in the collar at which

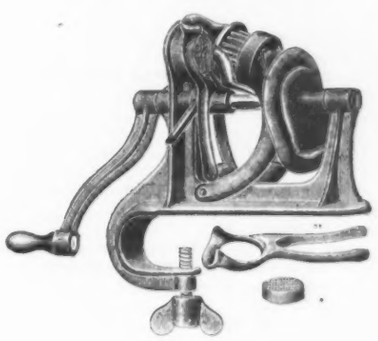


The Everlasting Chimney Cap.

the straps of the top are fastened are utilized when an extension is added, by driving eight-penny nails into them to hold the extension. These chimney caps are made in two sizes, with plates 22 inches square and 8½ inches at the collar, and 18 inches square and 8½ inches at the collar. The manufacturers state that after 15 years' experience in the making of chimney caps they believe that in this device they have secured the most effective cap yet produced.

American Wonder Raisin Seeder.

George Borgfeldt & Co., West Third, Fourth and Wooster streets, New York, are introducing the American Wonder raisin seed extractor, for family use, as here illustrated. In operation raisins to be seeded, after being moistened, are fed into the upper left hand aper-



American Wonder Raisin Seeder.

ture, when a turn of the crank forces a series of small gauge nickeled steel pins, covering a ¾-inch circle, through the fruit and against a rubber cushion perforated to receive the pins, thus pushing the seeds out. The various steel working parts, which are all nickeled and polished, are automatically controlled by the irregular shaped stamped steel cam or plate, ridged on the inner side and secured to the crank shaft, by means of which the pins are thrown forward and withdrawn, at the same time two steel arms set at different angles wiping away at the proper time both the seeded berry and the seeds. The action of this machine leaves a raisin seedless, but does not mangle or mutilate it, the subsequent cooking process swelling the raisin to its original form before curing. It is a high grade article, the standard being black japanned. It is 6¾ inches long from front of crank to back of standard, about 5 inches high, not including the screw, has a 1¼-inch opening for clamping to table or shelf and weighs 18 ounces.

Lisk's Oval Dinner Pail.

We present herewith illustrations showing the new oval dinner pail that is being manufactured by the Lisk Mfg. Company, Limited, Canandaigua, N. Y. This din-

Fig. 1.—Lisk's Oval Dinner Pail.

ner pail is referred to as made of the best quality charcoal tin plate in three sizes—4, 5 and 6 quarts. The trays, the cover and the cup are all seamless, and consequently are not liable to leakage. The body, trays and cover are heavily wired, making them unusually

Fig. 2.—Parts of Dinner Pail.

strong and able to withstand hard service. The ears are firmly fastened to the body and the bail handle is strong and durable.

Dall De Weese Hunting Knife.

Marble Safety Axe Company, Gladstone, Mich., have just added to their comprehensive line of fine sportsmen's specialties the Dall De Weese hunting knife, here illustrated, supplementing a large and varied assortment of hunting, canoe and yacht knives, which differ materially in the length and style of blades and handles. The knife under consideration has a blade 4 inches long, with handle either of fancy hard wood or German stag 3¾ inches in length, weighing complete with leather

Dall De Weese Hunting Knife.

sheath 4 ounces. The designer of this particular knife is a well-known hunter of large game in Colorado, his experience demonstrating the necessity of having every item of the outfit reduced to the lightest and most compact form permissible for effective work.

The Jacobson Friction Machinists' Vises.

The accompanying cuts represent vises offered by the Jacobson Machine Mfg. Company, Warren, Pa. In Fig. 1 is shown the universal friction swivel vise in an upright position, while Fig. 2 represents the same vise on its side. The vise is provided with a post, which is bolted to the bench, and the body of the vise is mounted upon this either in an upright position or on either

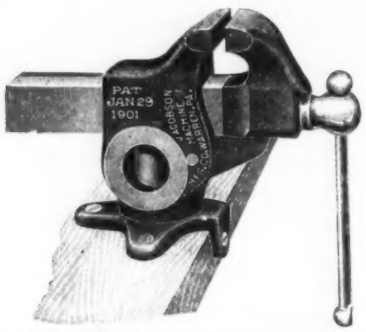


Fig. 1.—Universal Friction Swivel Vise.

side, and is free to turn around an entire circle about the post in an upright position or on either side. Inclosed within the body of the vise is a lock which is operated by the action of the screw, so that when the jaws begin to tighten upon any piece of work the lock is clamped onto the post and the vise is held firmly in whatever position it may be, when the screw is tightened. The vise may therefore be held at any point in the circle in any one of the three general positions. It is stated that the grip of the lock on the post is firm,

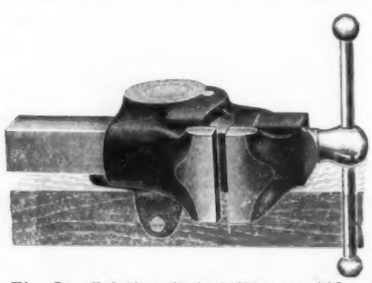


Fig. 2.—Friction Swivel Vise on Side.

and that it will hold solidly against chipping which is hard enough to knock the piece out of the jaws. The vise is especially adapted for tool room work, it is remarked, or any bench work that requires accuracy, or change of position, also that it may be advantageously used in connection with a drill press, where, by means of a special post, it may be used to drill work at any angle or, in fact, it may be used to drill work in practically any position desired. By being able to change the position instantly the work may at all times

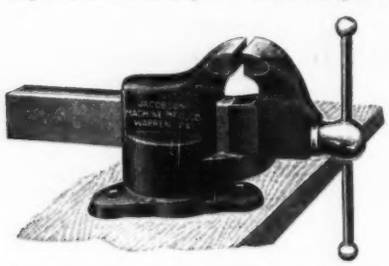


Fig. 3.—Friction Swivel and Bottom Vise.

be in the best position and in the best light to the advantage of the workman. The makers remark that the vise is carefully designed and that it is as heavy and as strong as any on the market. The vises are made with 3, 3½, 4, 4⅝ and 5¼ inch jaws. In the vise shown in Fig. 3 the special locking feature is maintained. It works only in an upright position, however, and is intended for all ordinary vise work. It is heavier in construction than the type shown in Fig. 1, and is designed especially for the larger sizes, being made with 4, 4⅝, 5¼ and 6 inch jaws.

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